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Development of an eHealth Harm Reduction Resource to Address Opioid Use Among Youth in

Rural Northern California

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### **Abstract**

**Problem:** Opioid use and misuse is a leading cause of injury and death among adolescents and young adults in the United States, with a three-fold increase in opioid overdoses since 2000 (Carney et al., 2018; Hudgins et al., 2019). Opioid misuse correlates with misuse of other substances, which exponentially increases health risks over time. The most effective treatment for opioid use disorder (OUD) among adolescence is through effective prevention interventions that either prevent the development of the OUD or enable timely diagnosis and treatment in order to prevent poor health outcomes.

**Context:** The use of eHealth technology, which has been successfully used in the management of other chronic diseases, including hypertension and diabetes mellitus, is one proposed intervention to prevent OUD among youth and to connect them with treatment resources (Nuamah et al., 2020). This technology could be particularly useful among youth due to their familiarity with and affinity towards using technology in their everyday lives. Granite Wellness Centers (GWC), a drug and alcohol treatment organization in rural Northern California, received grant funding from The California Youth Opioid Response (YOR California), to design and develop an eHealth resource to address OUD among youth ages 12 years to 24 years in rural Northern California communities (California Institute for Behavioral Health Solutions, 2015). This project sought to design and develop an eHealth resource and to conduct a pilot program.

**Interventions:** A youth focus group and online survey were conducted to gather stakeholder data and input regarding the design for the eHealth drug resource. The stakeholder data informed the design and development of the GWConnect mobile app, to include culturally-informed harm reduction tools, such as unbiased, evidence-based drug information; news

alerts; ask-a-provider feature; and local treatment resources. An 80-day pilot program was conducted to assess effectiveness of the app.

**Outcome Measures:** A pre/post pilot survey was administered to assess change in youth knowledge of drugs, knowledge of local drug treatment resources, and the likelihood that youth would use the app to access information on drugs and local treatment resources. The surveys also assessed whether youth found the app to be effective in delivering the aforementioned content and their level of satisfaction with the app.

**Results:** Through data analysis, results indicated a 26.47% increase in knowledge about drugs and a 20.32% increase in likelihood youth would use a mobile app to access information on drugs. Interestingly, even though the greatest increase was observed in knowledge of drug treatment resources and how to access them (45.83%), there was only a slight increase in the likelihood youth would use a mobile app to access information on treatment resources (14.09%). Overall, the pilot program participants were satisfied with GWConnect and found it to be effective.

**Conclusions:** Increased knowledge can empower youth to make informed decisions preventing substance use disorder and/or reducing harm related to risky behaviors Increased knowledge of treatment resources can improve timeliness of treatment initiation and reduce harm associated with untreated substance use disorder. The overarching aim of GWConnect is to reduce the incidence of OUD and overdoses among rural youth in Northern California; therefore, future longitudinal research is needed to assess its effectiveness over a period of time.

**Keywords:** Opioid use disorder/OUD, prevention, treatment, youth, adolescents, mobile application, mobile app, app, eHealth resource, and eHealth technology.

## Section II: Introduction

### Background

The opioid class of drugs includes prescription pain relievers, such as oxycodone, hydrocodone, morphine, and codeine; synthetic opioids, such as fentanyl; and illicit opioids, such as heroin (National Institute on Drug Abuse, 2020). Initially, prescription opioids were mainly used to treat cancer pain and acute pain, dating back to 1911 (U.S. Food and Drug Administration (FDA), Center for Drug Evaluation and Research, 2021).

Misuse of opioids refers to any use other than how they are prescribed or the use of illicit opioids in any way. Misuse of opioids increases the risk of overdose and death, and widespread misuse has results in an opioid overdose epidemic that has plagued the United States for over three decades (Centers for Disease Control and Prevention [CDC], 2021a). The opioid epidemic can be described by three distinct waves, periods of time in which significant spikes in opioid overdose deaths have been observed in the United States (CDC, 2021a).

The first wave of the opioid epidemic in the United States occurred in the 1990s, when there was an increase in opioid prescriptions and an increase in overdose deaths involving prescription opioids (CDC, 2021a). Several events preceded and contributed to the first wave. In the 1980s, two small retrospective studies, published by the *New England Journal of Medicine* and the *Pain Journal*, reassured medical providers that it was safe to prescribe opioids more frequently (Jones et al., 2018). Pharmaceutical companies then aggressively marketed opioids as non-addictive (Jones et al., 2018). In 1996, pain was added as the fifth vital sign. As a result, there was an increased priority placed on assessing and treating pain thoroughly and in a timely manner (Levy et al., 2018). Consequently, the threshold for administering prescription opioids

for the treatment of pain was lowered, and medical professionals began prescribing opioids more frequently (Scalpel, 2016).

The second wave occurred in 2010, approximately two decades after the first wave, when there was an increase in overdose deaths involving the illicit opioid heroin (CDC, 2021a).

Decades of overprescribing opioids resulted in an increase in the number of people who developed a physical dependence to opioids, which would result in withdrawal symptoms if they stopped taking these medications (Jones et al., 2018). This opioid-dependent population also developed a higher tolerance over time that required more opioids to achieve the same effect. As a result, if unable to obtain enough prescription opioids to meet their physical dependence and prevent withdrawal symptoms, people began to seek out and use illicit opioids, such as heroin or any opioids obtained on the street without a prescription (CDC, 2021a). Consequently, there was an increase in heroin overdose deaths in 2010 (CDC, 2021a).

The third wave occurred in 2013, a few years after the second wave, when there was an increase in overdose deaths involving synthetic opioids, particularly fentanyl (CDC, 2021a). The demand for fentanyl has remained high to the present day. Fentanyl is found in combination with other substances, rendering it exponentially more dangerous (CDC, 2021a).

An opioid use disorder (OUD), encompassing misuse and abuse of opioids, is a high-risk behavior that has been noted to result in increased crime, utilization of health care services, and disease transmission, as well as lost productivity and strained personal relationships (Timko et al., 2016). There has been a significant societal impact related to the opioid crisis, in addition to the increased costs that society has absorbed due to lost employment, criminal justice utilization, healthcare services, and fatal opioid overdoses (Hagemeier, 2018). In 2015, it was estimated that the total annual economic burden of the opioid crisis was \$504 billion (Hagemeier, 2018).

As well as the financial cost, OUD increases an individual's morbidity and mortality risk by increasing the risk of drug overdose, cardiovascular disease, cancer, and infectious diseases, such as Hepatitis C (Hser et al., 2017). In the United States in 2016, there were 64,000 deaths due to drug overdoses, with 66% of those due to opioids (Jones et al., 2018). From 1999 to 2014, fatal opioid overdoses tripled among young people ages 15 years to 24 years (Saloner et al., 2017). The U.S. Department of Health and Human Services (2019) classified the opioid epidemic as a public health emergency in 2017.

### **The Problem: Adolescents and Opioid Use**

Substance use is often initiated during adolescence (National Institute on Drug Abuse, 2020). From 1994 to 2007, the prescribing rates for prescription opioids among adolescents and young adults doubled (American Society of Addiction Medicine, 2016). However, adolescents in the United States are at high risk of being exposed to and becoming dependent upon opioids for many additional reasons, including, but not limited to, ready access, a developing and vulnerable state of mind, peer pressure, and engagement in risky behaviors (National Institute on Drug Abuse, 2020).

Monitoring the Future study surveys a cross-sectional, nationally representative sample of high school seniors in the United States on an annual basis, and the prevalence data indicated that prescription opioid use increased steadily from 1976, with peaks in 1989 and 2002 and a brief decline from 2013 to 2015 (McCabe et al., 2017). Twenty-five percent of high school seniors reported opioid use (McCabe et al., 2017). Adolescents who reported non-medical opioid use indicated they initially started with medical opioid use (McCabe et al., 2017).

In 2015 and 2016, The National Survey on Drug Use and Health revealed that in the United States, 21% of adolescents (12 years to 17 years) and 32% of young adults (18 years to

25 years) used prescription opioids in the past year, and 4% of adolescents and 8% of young adults misused opioids (Hudgins et al., 2019). In 2016, the prevalence of adolescents who misused opioids in California was 7%, which is 3% higher than the national average, with higher rates observed in rural California communities, primarily due to limited resources (Regents of the University of California, 2020).

The National Institute on Drug Abuse for Teens (2019) reported that 57% of 12- to 17-year-olds who misused prescription opioids got them from a friend or relative, while 20% of 12th graders said they could get heroin if they so desired. In 2015, 21,000 adolescents in the United States reported using heroin (American Society of Addiction Medicine, 2016).

In 2015, 276,000 adolescents were using opioids for non-medical reasons, and 44% of those individuals were diagnosed with an addiction to opioids (American Society of Addiction Medicine, 2016). Opioid use and misuse is a leading cause of injury and death among adolescents and young adults in the United States (Hudgins et al., 2019). Most youth who misuse prescription opioids obtained them from a single prescriber, friends, or a family member. Opioid misuse also correlates with misuse of other substances, which exponentially increases health risks over time.

Treatment programs that incorporate both pharmacotherapy and biopsychosocial interventions have proven to be the most effective treatment for opioid dependence (Jones et al., 2018). The preferred treatment delivery method for anyone, adolescent or adult, with an OUD is medically-assisted treatment (MAT), because it takes a holistic approach by incorporating medication, behavioral therapy, and psychosocial supports, and it correlates with better patient outcomes (Timko et al., 2016). According to the Substance Abuse and Mental Health Services (SAMSHA, 2015), MAT programs have been shown to improve patient survival, increase

retention in treatment, decrease illicit opiate use, decrease criminal activity, increase ability to secure and maintain employment, improve birth outcomes for moms with OUD, decrease risk of contracting the human immunodeficiency virus (HIV) and Hepatitis C, and decrease risk of relapse.

The opioid crisis has significantly impacted adolescents, with a three-fold increase in opioid overdoses since 2000 (Carney et al., 2018). However, only about 8.5% of adolescents with OUD receive treatment (Carney et al., 2018). Carney et al. (2018) presented treatment protocols for adolescents with OUD based upon evidence-based research. The medication aspect of MAT includes prescription medications approved by the FDA to treat OUD. These medications include buprenorphine/naloxone, methadone, and naltrexone.

Buprenorphine is a partial opioid agonist that diminishes opioid withdrawal symptoms, reduces cravings, increases safety in the event of an opioid overdose, and has a low potential for misuse and diversion (SAMSHA, 2015). Buprenorphine is also available in combination with naloxone, the rescue medication used to treat opioid overdose. Methadone is a full opioid agonist that reduces opioid cravings and withdrawal symptoms and blocks the effects of opioids (SAMHSA, 2015). Naltrexone is a competitive opioid receptor antagonist that blocks the euphoric and sedative effects of opioids and reduces opioid cravings. Naltrexone is not addictive and does not cause withdrawal symptoms when it is discontinued (SAMHSA, 2015). Carney et al. (2018) recommended that primary care providers become familiar with the prescribing practices of these medications in order to better serve adolescents with OUD, especially in settings with limited resources, such as rural areas.

The medications to treat OUD have been well-studied and approved for use in adults, but little research has been done on their use among youth because the prevalence of OUD among



youth has only recently been identified as a significant problem (Camenga et al., 2019).

Camenga et al. (2019) conducted a literature review of 14 published works on methadone, buprenorphine, and naltrexone to obtain efficacy data among adolescents. They found that the risk of not treating OUD outweighs the risk associated with any of the medications.

Chang et al. (2018) proposed treatment protocols for adolescents and young adults (15 years to 25 years) with OUD based upon evidence-based research. Buprenorphine/naloxone is currently approved for use in 16-year-olds. Methadone can be prescribed under the age of 18 years, but parental consent or evidence of failed abstinence or difficulty with withdrawing from opioids may be required (Chang et al., 2018). Buprenorphine/naloxone is safe for use among youth with OUD and should be considered first-line treatment. The American Academy of Pediatrics and other agencies have expressed their support of buprenorphine/naloxone and methadone for treatment of youth with OUD because the benefits of treating OUD with these medications appear to outweigh the risks of potential medication side effects (Chang et al., 2018).

Even though there is limited data to demonstrate efficacy of these medications in adolescents, anecdotal and practice-based evidence demonstrates better health outcomes (Chang et al., 2018). A recent study demonstrated that prolonged use of the aforementioned medications was effective in preventing relapse (Chang et al., 2018). Youth reported that buprenorphine/naloxone was superior to methadone in reducing cravings and withdrawal symptoms (Chang et al., 2018).

Another important factor youth reported was they perceived less stigma associated with buprenorphine/naloxone versus methadone. Stigma and shame are contributing factors as to why individuals with OUD do not seek treatment (Carson, 2019). Carson (2019) utilized theoretical

principles to better understand how medical providers may increase barriers to treatment for adolescents with OUD based upon their own unconscious biases. The article addresses the phenomena that many healthcare providers place a stigma on OUDs, which prevents them from discussing and initiating treatment, even life-saving measures such as naloxone. Medical providers ought to be aware of any unconscious biases they may have that can lead to stigmatizing OUD and that may have negative implications on their ability to discuss the realities of an OUD with their patients.

Buprenorphine/naloxone can be prescribed by any approved provider in any setting; whereas, methadone must be prescribed, dispensed, and monitored with frequent follow-up visits by a methadone clinic (Chang et al., 2018). As a result of the findings in the Chang et al. (2018) study, the use of buprenorphine/naloxone is considered first-line treatment for adolescents with OUD; methadone is considered second-line treatment.

Naltrexone is the third FDA-approved medication to treat OUD. Naltrexone carries a potentially serious side effect of increased risk of fatal overdose in the event of a relapse because the medication reduces one's opioid tolerance. For example, if someone taking naltrexone relapses and uses the same amount of opioids they were accustomed to using prior to starting naltrexone, they could die from an unintentional fatal overdose due to their decreased opioid tolerance (Chang et al., 2018). Relapse is a common phase in the cycle of any chronic condition, including addiction; therefore, every person should receive extensive counseling on this potential side effect prior to starting the medication (American Addiction Centers, 2019). The extended-release formulation of naltrexone may carry less risk of fatal overdose because it is released into the body at a slow rate; further studies are needed on its use among adolescents.

In addition to the medications, the psychosocial supports are the other aspect of MAT and are recommended during all stages of treatment (Chang et al., 2018). Psychosocial supports include various forms of individual, group, and/or family counseling and behavioral therapies.

Feder et al. (2017) conducted an observational study and analyzed data from the 2013 Treatment Episode Data Set to quantify adolescents' current use of MAT. They found that about 26% of adults in treatment for heroin addiction receive MAT services, compared to only about 2% of adolescents. The reasons for adolescent underutilization of MAT are not well understood, because MAT has not been widely studied among adolescents, but patient, parent, and physician preferences are thought to be contributing factors (Feder et al., 2017). Another barrier is that, despite the dramatic rise in the prevalence of OUD among youth, medical providers, particularly pediatricians and primary care providers, have not received adequate training in addiction treatment and have not established connections within their communities to readily and efficiently refer patients to MAT programs (Feder et al., 2017).

Hadland et al. (2018) reported that the initiation of medication to treat OUD at the time of diagnosis results in better health outcomes due to improved retention in treatment compared to the initiation of psychosocial interventions alone. The aforementioned medications approved to treat OUD primarily do so by reducing cravings and withdrawal symptoms and blocking or blunting the effects of opioids (SAMHSA, 2015). However, Hadland found that only 25% of young adults (18 years to 22 years) and only 4.5% of adolescents (18 years and younger) were prescribed medications to treat OUD at time of diagnosis. Adolescents are not receiving the full spectrum of OUD treatment.

The most effective treatment for OUD among adolescents is through effective prevention interventions that either preclude the development of the OUD or enable timely diagnosis and

treatment in order to prevent poor health outcomes. Screening for risk factors during adolescence and taking steps to better understand social determinants of health is necessary to identify barriers that delay diagnosis and treatment, as well as treatment retention (Grubb, 2019).

Education, or lack thereof, may be an important barrier to assess. Schepis et al. (2018) conducted a cross-sectional study utilizing data from the 2015 National Survey on Drug Use and Health and found that the highest rates of misuse were observed among individuals who were poorly engaged in school or not in school at all. Another barrier may be current policies that limit access or impose certain processes that make it difficult to gain access to proper evaluation and treatment; policy change is needed to expand access and facilitate ease of referral to MAT services for adolescents (Feder et al., 2017). This DNP project sought to research and develop an innovative harm reduction resource to address opioid use among youth in rural Northern California.

### **Specific Aims**

The overarching aim is to reduce the incidence of OUD and overdose among rural youth in Northern California. The project goal is the development and implementation of an eHealth intervention by May 2021 that will provide culturally-informed harm reduction tools (e.g., unbiased drug information, Narcan information, news alerts, ask-a-provider feature, and referral resources) to reduce the prevalence of substance use disorder (SUD) and OUD among rural youth. The SMART (specific, measurable, achievable, realistic, and timely) objectives for the project are:

1. Youth (12 years to 24 years) in Northern California will be more knowledgeable about drugs after having access to the GWConnect app for up to 80 days.

2. Youth will be more knowledgeable of drug treatment resources in Northern California and how to access them after having access to the app for up to 80 days.
3. Youth will be more likely to use the app to access information on drugs and treatment resources in Northern California after having access to the app for up to 80 days.
4. Youth will report a high level of satisfaction with the app after having access to it for up to 80 days.
5. Youth will report that the app is effective in providing information on drugs and local resources after having access to it for up to 80 days.

### **Available Knowledge**

#### **PICOT Question**

The PICOT question is, among youth in a rural Northern California community (P), are eHealth interventions (I), compared to standard interventions (C), effective in increasing knowledge related to substance use/misuse and treatment options (O) within 80 days (T)? The summary of evidence is organized in an evaluation table in Appendix A.

#### **Search Process**

A comprehensive search of the available literature was performed using the databases PubMed, CINAHL, Scopus, PsychINFO, and Joanna Briggs. Search terms included *opioid use disorder/OD, prevention, treatment, youth, adolescents, mobile application, mobile app, app, eHealth resource, and eHealth technology*. There are opioid abuse and dependence treatment guidelines in Dynamed for adults, but there are no specific guidelines for MAT among adults or youth. There were no systematic reviews on MAT for adults or youth in Cochrane. Journal articles were carefully selected for this manuscript based on the following search criteria: articles published within the past 6 years and articles in the English language.

### **Evidence Appraisal Tool**

The Johns Hopkins Nursing Evidence-Based Practice Appraisal Tool was utilized to analyze the research (Dang & Dearholt, 2017). The research articles selected for this DNP project were appraised utilizing the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (see Appendix A). This rating scale examines the strength of the evidence (e.g., Level I-V) and the quality of the evidence (e.g., high, good, or low).

### **Literature Review**

#### ***eHealth Resource/Technology***

The use of eHealth technology is one proposed intervention to prevent OUD among youth and connect them with treatment resources and services (Nuamah et al., 2020). The terms *mobile application*, *mobile app*, *app*, *eHealth resource*, and *eHealth technology* all refer to a computer program or software that runs on mobile devices, including phones, tablets, and watches. This review will use the aforementioned terms interchangeably.

There has been an increase in eHealth technologies related to drugs; however, the majority have been developed for use by medical providers as a reference tool for treatment guidelines and recommendations (Nuamah et al., 2020). Mobile technologies have been developed for and successfully used in the management of other chronic diseases, including sickle cell disease, hypertension, diabetes mellitus, and chronic obstructive pulmonary disease, to name a few (Nuamah et al., 2020). Designing and developing eHealth technologies specifically for the management of OUD could eliminate a barrier to MAT treatment by allowing the patient the ability to communicate with a medical provider, track his or her symptoms, and access evidence-based information and reliable resources related to OUD. This technology could be

particularly useful among youth due to their familiarity with and affinity towards using technology in their everyday lives.

Cordova et al. (2018) assessed the usability and acceptability of a mobile health (mHealth) app among adolescents and its effect on health risk behaviors, specifically drug use, condomless sex, and STI/HIV testing. The study took a multiple-methods approach and purposive sampling of 30 adolescents (13 years to 22 years), predominantly African American and female, in Southeast Michigan. The mHealth preventive intervention was designed in collaboration with a youth leadership council. Quantitative and qualitative usage data of the mHealth resource were collected from July to September 2015. The adolescents were asked to fill out a demographic questionnaire and health risk behavior assessment questionnaire, test the mHealth resource on iPads, complete modules to assess usability, and participate in either a focus group or individual interview to discuss the overall experience. Pre-assessment data revealed that 36% of adolescents self-reported illicit drug use within the past 90 days, and 71% of adolescents self-reported engaging in sexual activity within the past 90 days.

The participants were asked the same open-ended questions about what they thought about the mHealth app, which aspects they liked or found useful, and what they would change, in both the post-assessment focus group and the individual interviews. The focus group and interviews were recorded, transcribed, and analyzed. Content analysis was utilized to organize the data into categories and themes for analysis. The quantitative data was collected via demographics questionnaire and health risk behavior questionnaire (0=no, 1=yes). Participants filled out a 13-item Session Evaluation Form (SEF) with Likert-type responses ranged from 1 for *strongly agree* to 5 for *strongly disagree*, and an 8-item Client Satisfaction Questionnaire (CSQ) with Likert-type responses ranged from 1 for *poor* to 5 for *excellent*. Descriptive statistics

analysis was used to analyze the demographic and health risk behavior data, and means and standard deviations were calculated to analyze the SEF and CSQ.

Post-assessment data revealed adolescents reported high levels of usability and acceptability of the mHealth intervention. Adolescents found that the online risk assessment was a great way to initiate a conversation with their medical provider about sensitive subjects related to health risk behaviors. The mHealth resource provided access to information on drugs that adolescents found to be helpful, increased their knowledge, and gave them tools to use in order to make informed decisions. Overall, adolescents found the mHealth resource to be helpful in engaging them in preventing health risk behaviors, specifically related to drug use and sexual practices. This article is rated Level III and good quality according to the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (Dang & Dearholt, 2017).

Cordova et al. (2019) assessed feasibility and accessibility of Storytelling 4 Empowerment (S4E), a mobile app aiming to prevent substance use and STI/HIV. This multi-method study utilized community-based participatory research principles (CBPR) and design thinking to design an app that would engage both medical clinicians and youth. The S4E was designed, based upon community member input from youth, ages 13 to 22, and clinicians, as well as innovative approaches taken by the research team, to include a risk assessment tool, motivational interviewing language to facilitate risk behavior discussions, and referral resources.

The use of S4E was evaluated among medical clinicians and youth, focusing on improving the communication between them, as well as reducing health risk behaviors among youth. Both youth and clinicians completed a demographic data survey at baseline. Youth also completed a baseline health risk behavior questionnaire that focused on drug use and sexual activity. Youth were asked direct questions about STI and HIV testing prior to and after



interfacing with S4E. Youth and clinicians were asked questions with Likert-type response regarding their experience with S4E related to communication between youth and clinician. Clinicians also completed a post-intervention satisfaction and acceptability survey.

Descriptive statistical analysis was utilized to describe the participants. The pre-intervention STI and HIV testing data was compared to the data collected post-intervention. Means were calculated in order to analyze the clinician satisfaction and acceptability survey. Qualitative post-intervention data was collected during youth and clinician interviews through a series of open-ended questions assessing overall experience and satisfaction. The interviews are recorded and transcribed. Content analysis categorized the data into themes.

The data suggested that S4E facilitated prevention approaches to reduce health risk behaviors, increased STI/HIV knowledge and testing, as well as communication between youth and clinicians. High levels of feasibility and acceptability were reported by both the clinicians and the youth. This article is rated Level III and good quality according to the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (Dang & Dearholt, 2017).

Cordova et al. (2020) stated that mHealth technology can be used to prevent and reduce health risk behaviors (e.g., substance use and unsafe sexual practices) among adolescents. S4E was evaluated for its effect on health behavior change among youth. S4E consists of three interactive online modules on alcohol and drug use and STI/HIV. Fifty youth, ages 13 to 21, were randomized to either the S4E arm or the standard care arm, with a pre-assessment, post-assessment, and a 30-day post-assessment.

Youth and clinicians completed a baseline demographics survey, and then a questionnaire with Likert-type responses following their interaction to assess their communication, language, and actions taken regarding health risk behavior services. Youth refusal skills regarding

substance use were assessed through two questions with responses on a scale of 1 for *very hard* to 4 for *not very hard*. Sexual risk behavior refusal skills were assessed through one question with responses on a scale of 1 for *strongly disagree* to 5 for *strongly agree*. Youth substance use and sexual risk prevention knowledge was assessed through four questions with an agreement scale. Finally, youth behaviors regarding substance use, sexual risk, and HIV/STI testing were assessed through yes and no answers, where 1 was used for yes and 0 was used for no.

Descriptive statistical analysis was utilized to analyze baseline data and any differences between the S4E arm and the standard care arm. Chi-square tests and 2-tailed *t* tests analyzed differences between the groups from the start of the study to the 30-day follow-up evaluation. Post-intervention changes regarding reported substance use, sexual risk behaviors, and STI/HIV testing were compared between the groups.

Randomization was successful in this study as there were no differences between groups at baseline. There no differences between the groups in either attrition ( $P=.92$ ) or number of days to follow-up ( $P=.68$ ). The S4E youth reported more risk communication with the clinicians ( $P=.58$ ). The S4E clinicians also reported more risk communication with the youth ( $P=.45$ ). The S4E youth reported a greater change in refusal skills for alcohol ( $P=0.67$ ) and drugs ( $P=0.68$ ). The S4E youth also reported greater change in prevention knowledge regarding sexual risk ( $P=.60$ ) and STI/HIV ( $P=.34$ ). There was not a significant change in reported substance use from baseline. The S4E group reported increased STI/HIV testing ( $P=.57$ ).

Youth in the S4E arm demonstrated a reduction in health risk behaviors over the past 30 days, including substance use, as well as increased knowledge of prevention strategies. mHealth technology can be utilized to reduce substance use and other health risk behaviors among youth.

This article is rated Level I and good quality according to the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (Dang & Dearholt, 2017).

Scheier et al. (2019) gathered stakeholder input on the design of an online, family-based drug prevention program called Strengthening Families Program (SFP). The in-person format has proven to be effective in preventing youth drug and alcohol use, but that delivery method requires a lot of resources. This mixed-methods study was a Phase I National Institute of Health funded Small Business Innovative Research Grant. The study engaged subject-matter experts and stakeholders in the design of the online SFP delivery. They conducted interviews with prevention and online learning experts and family services personnel. They also surveyed and conducted 10 focus groups with 85 adults.

A subject matter expert panel was convened, including five prevention scientists and five e-learning experts, for a teleconference interview. The subject matter experts answered questions regarding the feasibility of SFP online, its features, and how to implement it. Parents completed consumer preference surveys containing questions with either yes or no responses or Likert-type responses. The focus groups were recorded and transcribed for thematic analysis.

The principal findings of the thematic analysis revealed that the online program should include the drug prevention content in an interactive and engaging manner. There was an emphasis placed on brief skills-oriented sessions, graphics over text, animation, real-life role play scenarios, connection with agency personnel who can monitor progress, and printable materials to work on at home. This study informed the design and development of curriculum for an online, family-based drug prevention program based upon what the family wants to learn, in the preferred delivery format, and with features that facilitate engagement and retention. This

article is rated Level III and good quality according to the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (Dang & Dearholt, 2017).

Schuman-Olivier et al. (2018) assessed the feasibility, usability, and acceptability of MySafeRx, a mobile resource developed to promote buprenorphine/naloxone treatment adherence. They conducted a 28-day, single-arm, observational study of the use of MySafeRx resource among early adults (18 years to 39 years) receiving buprenorphine/naloxone (B/N) for treatment of OUD. The MySafeRx technology incorporates motivational mentorship, ability to message your medical provider, and medication monitoring. The MySafeRx technology includes a secure electronic medication organizer that the app can unlock, text messaging with the treatment program, daily videoconference with a trained mobile recovery coach utilizing motivational interventions, and supervised medication self-administration via videoconference.

The study began with an in-person training on the use of MySafeRx technology. The study participants attended a daily videoconference with a trained mobile recovery coach, completed weekly surveys regarding feasibility, usability, and acceptability, as well as weekly urine toxicology screenings during the 28-day study and for an additional 4-weeks post-intervention.

Study participants completed a baseline survey about demographics, substance use history, and technology use. Supervised medication self-administration through videoconferencing and medication adherence surveys assessed app feasibility. The initial in-person training and a post-intervention survey assessed app usability. A weekly satisfaction survey, a post-intervention satisfaction survey, and urine toxicology screening assessed app acceptability.

Descriptive data analysis was utilized. In terms of feasibility, two-thirds of participants completed supervised medication self-administration 5 or more days per week and 83% self-reported medication adherence. The in-person training resulted in high levels of user competency and the post-intervention survey demonstrated an average system usability score of 78.8. The satisfaction surveys revealed overall satisfaction with the pill dispenser, videoconference, and text messaging, and 75% of the participants expressed interest in continuing to use MySafeRx. The urine toxicology results demonstrated a 41.7% average level of illicit opioid abstinence during the first week of the study which increased to 63.6% during weeks three and four.

Illicit opioid abstinence increased by 53% during the 28-day trial period. Participants reported good levels of usability and acceptability of the MySafeRx technology. The MySafeRx, or other similar mobile technology, can be used to increase adherence to OUD treatment. This article is rated Level III and good quality according to the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (Dang & Dearholt, 2017).

### **Rationale**

#### **Conceptual Framework**

The conceptual framework that guided this project was the social ecological model (SEM). Urie Bronfenbrenner introduced the SEM as a conceptual framework in the 1970s, and it was later adapted into a theory in the 1980s (Kilanowski, 2017). Using the SEM helps describe the interconnectedness of individual, relationship, community, and societal factors, and how they influence health behaviors (CDC, 2021b). The individual is at the center of this model; the next layer includes relationships which are the microsystem that has the most impact on the individual (Kilanowski, 2017). Then, there is the community which is the mesosystem that includes work, school, church, and neighborhood (Kilanowski, 2017). Finally, there are societal factors,

including social networks, which account for the exosystem that indirectly influences the individual (Kilanowski, 2017). A successful intervention will address all SEM levels in order to truly impact health behavior and create change (CDC, 2021b).

The opioid crisis has persisted for several decades within the United States, and most efforts to thwart its progression have been directed towards adults with OUD. On average, most people who use or misuse drugs had their first encounter with drugs at 12- to 13-years old; however, few interventions target this age group (Natural High, 2020). My team wanted to tailor this eHealth resource to youth because significant efforts have not been made to update and deliver drug prevention and treatment initiatives that are relevant to today's youth population in order to address this issue at time of onset.

The Granite Wellness Center Youth Resiliency Program (GWCYRP), which encompasses my project, is trying to create change by developing and delivering preventive and treatment strategies specific to youth with OUD within the community that is affected by this problem. On the individual level, my project sought to become acquainted with our primary stakeholders via a focus group and an online survey to gain a deeper understanding of their beliefs and attitudes towards substance use, misuse, and treatment. That information has driven the design and development of the eHealth technology from the beginning. On the relationship level, we discussed how relationships influence behavior, and we learned that our primary stakeholders were seeking peer connection and support when looking for information on substance use, misuse, and treatment. As a result, we enabled a feature in the mobile eHealth resource called GWConnect (Granite Wellness Connect) to allow for peer-to-peer connection and communication. On the community level, we collaborated with experts in harm reduction in order to best communicate with our stakeholders. We received contributions from local artists to

improve the aesthetic of the app, and we communicated with other local drug and alcohol facilities to build a database of available services in the local area. On the societal level, we wanted to create an eHealth resource that was customized to our primary stakeholders in Nevada and Placer Counties. We also wanted GWConnect to be available to anyone looking for such a resource, whether a young person in need of information on drugs or a medical provider in need of a tool to engage a young person in drug treatment. Therefore, GWConnect will be readily accessible to anyone who has access to the Google and Apple stores. Essentially, anyone can use and may benefit from the app, and other communities can utilize it to engage with their youth population.

Harm reduction principles also guided this project. The concept of harm reduction is to reduce the deleterious effects of health behaviors without completely eliminating the health behavior itself (Hawk et al., 2017). Hawk et al. (2017) defined six principles of harm reduction:

1. Humanism refers to the fact that every individual deserves respect and dignity, and there is an understanding that harmful health behaviors also benefit the individual in some way, so it is of value to assess both the harm(s) and the benefit(s) in order to gain a better understanding as to why individuals make certain decisions.
2. Pragmatism refers to the fact that perfection is not attainable, even when it comes to health behaviors, and social and environmental factors influence behavior, and therefore, should be taken into account to better understand the underpinnings of the behavior.
3. Individualism refers to the fact that every person has his/her own needs and strengths, and it is essential to tailor intervention options in order to find the best fit for the individual at that particular time in his/her life.

4. Autonomy refers to the fact individuals make health decisions for themselves, and medical providers should provide information that empowers the individual to make an informed decision.
5. Incrementalism refers to the fact that any positive change, no matter how small, can improve health, with the understanding that one can plateau or even regress throughout this process.
6. Accountability without termination refers to the fact that individuals are accountable for their actions, and medical providers can help them understand their actions and the consequences without terminating the relationship for not progressing in a linear manner.



### **Section III. Methods**

#### **Context**

There is an unmet need to provide youth with access to culturally-informed harm reduction tools in order to reduce the incidence of OUD. Providing youth with unbiased drug information, Narcan information, news alerts, ask-a-provider feature, and referral resources can increase knowledge and informed decision-making and reduce barriers to treatment access. An eHealth resource is the ideal means to deliver this information to youth, given their avid use of, familiarity with, and ready access to this technology (see Appendix B. Gap Analysis).

#### **The Organization: Granite Wellness Centers**

This project was completed at Granite Wellness Centers (GWC). Formerly known as Community Recovery Resources, GWC is a nonprofit 501(c)(3) corporation that has been providing drug and alcohol treatment in Northern California since 1974 (GWC, 2021). The GWC has six locations throughout Nevada and Placer Counties and employs 165 staff members (GWC, 2021). The GWC has an annual operating budget of approximately \$10 million. Funding sources include local, state, and federal grants, as well as donations and contributions (GWC, 2021).

The GWC's (2021) mission statement is to promote wellness and quality of life. They provide drug and alcohol treatment in inpatient and outpatient settings, MAT, detoxification, driving under the influence classes, transitional housing, treatment for adolescents, services for parents and families, life skills and wellness, and drug testing services (GWC, 2021). The majority of these services are for adults, 18 years and older, unless specifically identified as adolescent services. The GWC is actively working towards expanding services for adolescents.

### **Granite Wellness Centers Youth Resiliency Project**

The California Youth Opioid Response (YOR California) awarded GWC with a \$500,000 grant to fund GWCYRP. The purpose of the GWCYRP is to develop and deliver a system of care that addresses OUDs among young people. The values for the GWCYRP are “respect, cultural humility, innovation, partnership, and integrity” (California Institute for Behavioral Health Solutions, 2015, p. 1). The target population for this project is young people ages 12 years to 24 years in rural Nevada and Placer Counties. This DNP project was one of the many projects under the GWCYRP umbrella.

The California Youth Opioid Response (YOR) team developed an implementation plan consisting of six goals to direct the grant recipients’ use of the funds. My project is specifically involved in Goal 5, which states, “Prevent opioid misuse, abuse and overdose deaths, and reduce use of opioids among youth ages 12-24 with the development of culturally-informed, youth sensitive clinical services available on a drop-in, confidential basis” (California Institute for Behavioral Health Solutions, 2015, p. 2). The objective for Goal 5 is as follows,

Utilizing a Positive Youth Development Framework, develop and implement culturally and trauma informed youth sensitive clinical services focused on behavioral health issues. GWCYRP adolescent health clinical services will address the critical components of youth sensitive services, including: accessibility, confidentiality, availability of providers specifically trained in adolescent health care, use of an innovative, nontraditional health care setting in a safe environment, and the implementation of eHealth technologies (California Institute for Behavioral Health Solutions, 2015, p. 2).

There are many community-based organizations that are stakeholders in GWCYRP and support the implementation plan in various capacities, to include, the Coalition for Auburn

Youth, the Coalition for Nevada County Youth, Chapa De Indian Health, Sierra Care Pediatrics, Nevada County Health and Human Services, Placer County Health and Human Services, Placer Nevada Rx Safety Coalition, Idea Consulting, Youth from Nevada Union High School, Nevada County Superintendent of Schools Tobacco Use Prevention Education, Placer County Office of Education, and multiple regional school districts (California Institute for Behavioral Health Solutions, 2015).

### **Interventions**

The DNP student was a member of the GWConnect team, which consisted of the grant principal investigator, software engineer, youth coordinator, app designer, lead app developer, and a public health expert. The team conducted in-person focus group and online survey (due to COVID-19 restrictions) to assess the needs of our primary stakeholders. Invitations to attend the focus group were sent to high schools in Nevada and Placer Counties, and the online survey was advertised via social media. The focus group included 15 participants and the online survey had 28 respondents. The focus group and online survey data informed the design and development of the eHealth drug resource.

The DNP student contributed to the design and development of the eHealth drug resource by building an evidence-based drug dataset and recording a guided body scan for inclusion in the app. The DNP student also conducted a pilot project, in which youth in Nevada and Placer Counties were given access to the app for 80 days and asked to complete pre- and post-surveys assessing knowledge of drugs and local treatment resources. The pilot project had 29 participants. The pre-survey results reveal limited knowledge of evidence-based information on drugs and available treatment resources, resulting in an underserved adolescent population with OUD or at risk of developing an OUD.

**Gap Analysis**

A gap analysis was conducted for this DNP project to assess the current state of this issue, the desired state, and the action needed (see Appendix B). An individual risk factor for youth substance use has been cited as a deficiency of knowledge regarding drugs and risk of use (Griffin & Botvin, 2010). The current state is limited knowledge of evidence-based information on drugs and available treatment resources, resulting in an underserved adolescent population with an OUD or at risk of developing an OUD. The desired state is access to evidence-based information on drugs and available treatment resources within a rural Northern California community in order to improve knowledge about drugs and use/misuse, as well as awareness of and how to access the available treatment resources within the local area. The action needed is to design and develop an eHealth drug resource specifically for the adolescent population within this rural Northern California community, publish it to the Google and Apple store for free download, and incorporate it into treatment protocols for youth with OUD at GWC.

**GANTT Chart**

A GANTT chart was utilized to outline the DNP project timeline from June 2020 to May 2021 (see Appendix C). A literature review was conducted regarding the use of eHealth resources to prevent and treat OUD among youth. The DNP committee, consisting of the committee chair and second reader, was assembled. Meetings between the DNP student, committee chair, and the GWConnect team were conducted. A focus group and an online survey of the primary stakeholders, youth 12 years to 24 years in Nevada and Placer Counties, were conducted. The data from the focus group and online survey informed the design and development of the app, which occurred from September to December 2020. The DNP student organized and conducted a GWConnect pilot program from January to April 2021. Youth in

Nevada and Placer Counties were given access to the app for 80 days and asked to fill out online surveys prior to and following testing of the app. The survey data were collected and analyzed from February to May 2021. The DNP project write-up began in January 2021 and was completed by May 2021. The paper was disseminated to the committee chair and the second reader, and final edits were made. The DNP project was presented to University of San Francisco faculty and students in May 2021.

### **Work Breakdown Structure**

Project details are outlined in a work breakdown structure (WBS; see Appendix D). The development of an eHealth harm reduction resource occurred in five phases: design, plan, intervention, results and evaluation.

During the design phase, the scope of the project was developed. A gap analysis was completed based upon a thorough literature review and a needs assessment specific to GWC in Grass Valley. Based on the gap analysis, project objectives were developed. Key stakeholders were identified. The DNP student met with the key stakeholders to better understand the vision, mission, and goals for GWC and for this project. A project charter was developed and submitted to the DNP chair for review.

During the plan phase, the GWConnect team was identified, with a discussion of roles. A project plan and the WBS were developed. The focus group questionnaire and surveys were developed and finalized.

During the intervention phase, the focus group and initial online survey were conducted to gather data from the primary stakeholders that would inform the design and development of the app. The data were analyzed and the GWConnect app was designed and developed. The DNP student researched and built an evidence-based drug data set and collaborated with personnel

familiar with harm reduction principles in order to tailor the data set to the primary stakeholders. The DNP student also recorded a guided body scan for inclusion in the GWConnect app. The DNP student conducted an app pilot program of the app and administered pre- and post-testing surveys.

During the results phase, the survey findings were analyzed. The findings were summarized and recommendations written. The evaluation phase consisted of reviewing feedback from surveys and verifying that recommendations align, writing the final report, submitting the DNP paper, and presenting the project to the University of San Francisco staff.

### **Communication Matrix**

Communication between all members of the GWConnect team and all stakeholders in the DNP project was critical throughout every stage of this project. The DNP student maintained direct communication throughout the entirety of this project with the committee chair via Zoom and email. The GWConnect team communicated on a regular basis via email, Zoom, team Dashboard account, and team Slack channel. A GWConnect webpage was created as a resource for the pilot program participants, which contained background information on the app and contact information for any questions. A communication matrix was created for the DNP project (see Appendix E).

### **Strengths, Weaknesses, Opportunities, and Threats**

An analysis of the strengths, weakness, opportunities, and threats (SWOT) was conducted (see Appendix F).

#### ***Strengths***

The vast majority of youth are familiar with and have ready access to mobile technologies. Youth usually have some sort of mobile technology with them most of the time,

making a mobile app an ideal intervention to use in this population. A main strength of this project is that mobile technologies have been successfully used to prevent and manage other chronic diseases. During the COVID-19 pandemic, people have become more reliant on mobile technologies to connect virtually due to limitations on in-person interactions. Another strength of this project is that increased knowledge can facilitate informed decision-making for youth that can prevent OUD. The app design and development were based on primary stakeholder data obtained via focus group and online survey; the app was designed and developed specifically for youth 12 years to 24 years in Nevada and Placer Counties. Finally, the app was funded through the YOR California grant, and the project had buy-in from the GWC administration.

### ***Weaknesses***

The fact that the app was designed and developed for youth 12 to 24 years in Nevada and Placer Counties is both a strength and a weakness, because youth in other counties may not find it applicable to them. A main weakness of this project is the ability to connect with youth and have them download the app, and then to keep them engaged so they will continue to use it. The app requires a medical provider to answer any questions asked, requiring frequent monitoring of the app in order to provide a timely response. The app also requires updates regarding news related to drugs, substance use, and warnings in the local area. Another weakness of this project is that the app will require continuous updates to remain compatible with Android and iOS operating systems. Finally, there are costs associated with maintaining and updating the app over time.

### ***Opportunities***

Initial research revealed that there is no comparable product currently available on the market. Primary stakeholders reported what they were looking for in an eHealth resource through

the focus group and online survey, which gave the team the opportunity to design and develop the app specifically for the primary stakeholders. This project creates an opportunity to connect with youth in a medium they prefer, are familiar with, and have ready access to. This project also offers the ability to remain connected with youth, even during the COVID-19 pandemic when in-person interactions are limited. Youth will have the opportunity to access evidenced-based information on drugs and treatment resources and to ask a medical provider questions in a secure, confidential, and non-confrontational manner. This project will dispel common myths about drugs and drug use. This project will prevent OUD among youth in Northern California.

### ***Threats***

One threat is app buy-in by youth. Youth may have a fear that their parents/guardians or the app administrator(s) are monitoring their activity, and simply accessing drug information could be perceived as thinking about or actually using drugs. Another threat is parents/guardians having a misperception that allowing youth to access information will make them more apt to use drugs. There is also concern that the YOR California grant funding may not be renewed. Overall, the strengths outweigh the weaknesses of this program. Based on the SWOT analysis, the program is feasible completed.

### **Budget**

The proforma for this project is forecasted for 3 years and accounts for changing expenses over the life of the program, with a 3% increase in Year 2 and Year 3 over the previous year (see Appendix G). The YOR California, funded by the California Department of Health Care Services (DHCS), awarded 22 grants totaling \$11 million in order to address OUD among youth ages 12 years to 24 years in rural Northern California communities (California Institute of Behavioral Health, 2015). In 2020, GWC received a \$500,000 grant and allocated the funds to



the GWCYRP, \$25,000 of which funded the design and development of the eHealth resource.

The DHCS renewed the funds in 2021, securing this grant as a reliable funding source.

GWC (2021) is a nonprofit 501(c)(3) corporation; therefore, there are no deductions from revenue. The 2016 and 2017 tax returns (Form 990) filed by GWC (formerly known as Community Recovery Resources or CoRR) were reviewed, and it was verified that there were no deductions from revenue.

The youth focus group was conducted at GWC and there were no associated fees. The youth online survey was generated and distributed online at no charge. The initial \$25,000 grant funds covered the cost of hiring an app designer and an app developer and the fees associated with registering the app with Google (one-time \$25 fee) and Apple (\$99 annual fee) app stores. The app will be available as a free download for users.

The pre- and post-pilot surveys were generated through Qualtrics for free and distributed via email. All participants who completed the pilot program, including and the pre- and post-surveys, were given \$5 Amazon ecards, totaling \$60. The DNP student used personal funds to finance the Amazon gift card incentive. Additional supplies included printouts/handouts and pens; the budget for supplies was \$100 in the first year (\$60 for Amazon ecards and \$40 for printouts/handouts and pens).

A part-time nurse practitioner and part-time app developer will regularly interact with the app, chat with users, answer questions posted, upload current events and warnings related to drugs, and schedule software updates, as needed, to ensure ease of use and accessibility. A portion of the 2021 grant funds are earmarked to cover the costs associated with maintaining and updating the app.

### **Return on Investment**

According to Salary.com (2021a, 2021b), the average nurse practitioner salary in Nevada County, California is \$113,473 (range \$105,481 to \$123,487), and the average salary for an app developer in California is \$73,973 (range \$66,158 to \$84,378). The total wages are \$81,737 in Year 1, \$95,426 in Year 2, and \$98,288 in Year 3. The employees are independent contractors who do not receive benefits. The total expenses are \$81,837 in Year 1, \$95,529 in Year 2, and \$98,394 in Year 3. The revenue less expenses is in the green for all 3 years: \$418,163 in Year 1, \$419,471 in Year 2, and \$432,056 in Year 3.

A return on investment (ROI) can be calculated for this project. Society will get a return on their investment in the form of significant cost savings and expense avoidance through GWConnect (see Appendix H). The long-term goal of GWConnect is that youth in Northern California will access it and report increased knowledge of drugs, which will result in decreased incidence of SUD among this population and, as a corollary, prevention of nonfatal and fatal overdoses.

The societal cost of opioid addiction per person can be calculated by totaling the associated healthcare, law enforcement, and legal costs (Florence et al., 2016). The total societal cost of nonfatal OUD was \$57 billion. This number can be divided by the number of people with an OUD in 2013 (1.9 million), resulting in a societal cost of \$30,000 per person per year for nonfatal OUDs. The total cost of fatal opioid overdoses was \$21.5 billion, divided by 16,235 deaths due to fatal opioid overdose in 2013, equates to a societal cost of \$1.3 million per fatal opioid overdose. The societal cost savings of one avoided fatal overdose is \$1.3 million. There are an average of 136 fatal opioid overdoses per day, resulting in a potential cost savings of \$176.8 million (\$1.3 million multiplied by 136; CDC, 2021).

To calculate the ROI, the cost of designing, developing and distributing GWConnect (\$81,837) is subtracted from the cost savings of just one avoided fatal overdose (\$1.3 million) and divided by the cost (\$81,837) to equal 14.89. The ROI for this project, in the form of societal cost savings and expense avoidance, is 1,489%! That is a significant ROI, making this project fiscally sound and worthwhile.

### **Study of the Intervention**

This DNP project aimed to design and develop an eHealth technology, GWConnect, for youth to increase awareness and knowledge of drugs and their effects, risks associated with substance use, and local resources available for SUD evaluation and treatment, within the context of harm reduction principles. An in-person focus group and an online survey (due to COVID-19 restrictions) were conducted to assess the needs of our primary stakeholders. The data collected informed the design of the GWConnect.

The GWConnect pilot program was conducted to evaluate its effectiveness in achieving the aforementioned short-term goals among the primary stakeholders. Pre- and post-pilot program surveys were administered to all study participants. Survey data were collected and analyzed using Qualtrics. The data findings were presented to the GWConnect team and used to update GWConnect prior to launching in Google and Apple stores, as well as to inform future app updates.

The long-term goal of GWConnect is that youth in Northern California will access it and report increased knowledge of drugs, which will result in decreased incidence of SUD among this population. Another long-term goal of this project is that youth will access the mobile app and report increased knowledge of local drug treatment resources, resulting in early

diagnosis of SUD and timely entry into treatment in order to improve long-term health outcomes. A longitudinal study is needed to assess the long-term outcome measures.

### **Outcome Measures**

The outcome measures for this DNP project were to work with the GWConnect team to conduct primary stakeholder in-person focus group and online survey, contribute to the design and development of GWConnect, conduct a pilot program including pre- and post-assessment surveys, analyze pilot program data, and create a final presentation with recommendations for future updates to GWConnect.

The GWConnect team conducted a focus group of our primary stakeholders during the initial planning phase in order to gain a better understanding of what youth were looking for in an eHealth drug resource. An advertisement seeking focus group volunteers was distributed to the local high schools in Nevada and Placer Counties. Inclusion criteria was anyone aged 12 years to 24 years old residing in Nevada or Placer Counties. There were 15 respondents (eight females and seven males) who attended the focus group. Youth were asked what features should be included in this app, if there were any other similar resources on the market they find helpful, the language that should be used, how it should be marketed, and any other advice they would like to offer.

The survey was advertised online via social media. Inclusion criteria was anyone 12 years to 24 years old residing in the United States; there were 28 respondents. The survey attempted to gather basic information for a general persona of our primary stakeholders, information that should be included in the drug info guide, how an interactive map of local resources should look, how information should be presented (e.g., text, illustration, video, audio), the ideal aesthetic for the app, and any other input the participant would like to contribute.

The survey collected demographic data, including age and gender. The survey attempted to get to know the primary stakeholders better through the following questions: What apps do you use most? Who are the most creative or interesting people you follow on Instagram (name at least three)? What's a brand or online store you think is particularly cool? Where do you hear about the news? What's your favorite way to learn new things? The survey assessed commonly used drugs among youth in a non-confrontational manner by asking the following question: What do you think are the most frequently used drugs among your friends and classmates? The survey assessed how informed youth were about drugs, their use, and their effects according to a scale of 0 to 10, in which 0 was *not informed at all* and 10 was *very informed*. The survey assessed if youth have ever looked for or asked someone for information about drugs and their effects, and if so, where did they look and/or who did they ask? The survey assessed if there is information that they would like to ask about drugs, but they are unsure how to ask or where to find the answer. The survey asked the respondents to rank the following drug information in order of importance: scientific names, street names, photos, precautions and safety for use, effects, duration of effects, risks, interactions with other substances, likelihood of addiction, how to test a substance for safety, antidotes/reversal agents, personal experiences, and an *Other* free-text answer. The survey assessed for any fears related to drugs. Finally, the survey asked if they have come across and/or used any drug or alcohol-related resources that they found particularly helpful.

The DNP student conducted a review of evidence-based resources to build a drug information database. The drugs included in the database were cocaine, heroin, inhalants, lysergic acid diethylamide (LSD), marijuana, 3,4-methylenedioxy methamphetamine (MDMA), methamphetamine, phencyclidine (PCP), synthetic cannabinoids, synthetic cathinones, tobacco,

alcohol, prescription central nervous system depressants, prescription opioids, prescription stimulants, prescription anabolic steroids, over-the-counter (OTC) dextromethorphan, and OTC loperamide. The database included information on drugs, including commercial names, street names, a brief description of the drug, common forms, common ways the drug is taken, the Drug Enforcement Administration schedule/classification, short- and long-term effects, other health-related issues, withdrawal symptoms, and treatment options, including medications and behavioral therapies. One of the recurrent themes of the focus group and initial online survey was the importance of incorporating mindfulness components, such as meditations and body scans, into this app. Therefore, the DNP student also researched and recorded a 6-minute guided body scan meditation for inclusion in the app.

The GWConnect app pilot program was conducted from March to May 2021. Inclusion criteria was anyone 12 years to 24 years residing in Nevada and Placer Counties. The completion of a pre- and post-survey was required. The survey collected demographic data, including state and county of residence, age, gender, possession of mobile device, the operating system of their device, and email address. An email invitation was sent to each participant containing a unique code to download GWConnect. The participants were given access to the app for up to 80 days and were instructed to peruse all the features and take notes in real-time in order to provide feedback in the post-pilot survey.

The pre-pilot survey (Appendix I) assessed baseline knowledge of drugs and local drug treatment resources through the following two questions: How knowledgeable do you feel about drugs? If you or someone you know needed help for drug use/misuse, how knowledgeable are you regarding where resources are in your local area and how to access them? Likert-type responses ranged from 1 for *not knowledgeable at all* to 5 for *extremely knowledgeable*. The

survey assessed baseline likelihood that youth would use the app to access information on drugs and local treatment resources through the following questions: How likely are you to use a mobile app to access information on drugs? How likely are you to use a mobile app to access information on treatment resources in your local area? Likert-type responses ranged from 1 for *extremely unlikely* to 5 for *extremely likely*. The final question allowed multiples answers and asked: What features are important to include in a mobile app containing information on drugs and related resources? The answer choices included drug facts and figures, treatment resources, mindfulness activities, education on Narcan, warnings related to drug use in your community (e.g., uptick in fentanyl overdoses), ability to chat with and ask a medical provider questions, Q&A Forum, and a free-text option.

The post-pilot survey (see Appendix J) assessed for any changes in knowledge of drugs and local drug treatment resources, after having access to GWConnect for up to 80 days, through the following two questions: After beta testing the Granite Connects app, how knowledgeable do you feel about drugs? After beta testing the Granite Connects app, how knowledgeable are you regarding drug treatment resources are in your local area and how to access them? Likert-type responses ranged from 1 for *not knowledgeable at all* to 5 for *extremely knowledgeable*. The survey assessed for any changes in likelihood that youth would use the app to access information on drugs and local treatment resources through the following two questions: After beta testing the Granite Connects app, how likely are you to use this app in order to access information on drugs? After beta testing the Granite Connects app, how likely are you to use it in order to access information on treatment resources in your local area? Likert-type responses ranged from 1 for *extremely unlikely* to 5 for *extremely likely*. The survey assessed usefulness of the features through the following question: After beta testing the Granite Connects app, which feature(s) did

you find informative and/or useful? This question allowed for multiple answers, and the choices included drug facts and figures, treatment resources, mindfulness activities, education on Narcan, warnings related to drug use in your community (e.g., uptick in fentanyl overdoses), ability to chat with and ask a medical provider questions, Q&A Forum, and a free-text option. The survey assessed satisfaction through the following question: How satisfied are you with the Granite Connects app? Likert-type responses ranged from 1 for *extremely unsatisfied* to 5 for *extremely satisfied*. The survey assessed effectiveness through the following question: How effective is the Granite Connects app in providing information on drugs and local resources? Likert-type responses ranged from 1 for *not effective at all* to 5 for *extremely effective*. The final question asked what improvements can be made to the app and allowed for multiple free-text answers.

### **Analysis**

The primary stakeholder focus group took place in-person at GWC Grass Valley location. The group sat in chairs arranged in a circle. The questions were verbally posed to the group, and each participant verbally responded with an answer. All of the participant responses were annotated. The GWConnect team reviewed the transcript and thematically analyzed the data. The primary stakeholder survey was distributed online. The intent of the survey was to learn more about the primary stakeholders and what they were looking for in an eHealth resource, so the data were analyzed both qualitatively and quantitatively. The survey responses were entered into Excel and arranged in charts and graphs. The demographic data were depicted in pie charts. Microsoft Word was utilized to create a word cloud that depicted the frequency with which the respondents used various apps. Thematic analysis was applied to the social media accounts that they followed and the overall messages that those accounts were sending, as well as to describe the aesthetic of those accounts.



Excel calculated the percentage of respondents who used some sort of mindfulness app. Their go-to news-related resources and the ways in which they prefer to learn were arranged in bar charts. The respondents ranked substances from most to least commonly used among their friends and classmates, and those answers were arranged in a bar chart. Drug-related insight data were depicted in a bar chart. *Yes/No* responses regarding whether or not youth sought out information on drugs were depicted in a pie chart. Answers to the follow-up, free-text question regarding where they looked or who they asked were listed in a chart. The respondents ranked various information related to drugs as either *very important*, *important* or *not important*, and that information was depicted in a bar chart. Fears related to drugs were organized in a bar chart. The free-text answers regarding use of any informative drug-related resources were listed in a chart.

A Google spreadsheet was utilized to track participation in the pilot program. Qualtrics was used to create and distribute the pre- and post-pilot surveys and to collect the qualitative data. Qualtrics organized the pre- and post-pilot survey data into tables and either bar or pie charts, which were easily exported for visual comparison. The Likert responses were numerically ranked from *not knowledgeable at all* (1) to *extremely knowledgeable* (5), *extremely unlikely* (1) to *extremely likely* (5), *extremely unsatisfied* (1) to *extremely satisfied* (5), and *not effective at all* (1) to *extremely effective* (5). The pre- and post-pilot survey responses were analyzed by Qualtrics, and the mean percent change, standard deviation, and variance were reviewed to determine the effectiveness of the pilot program in increasing knowledge of drugs and local treatment resources among the youth who participated. Percentages of satisfaction and app effectiveness were calculated. The GWConnect team reviewed all free-text answers regarding current and future revisions to the GWConnect app.

### **Ethical Considerations**

The University of San Francisco DNP department determined that this project met the guidelines for an evidence-based practice change project, as outlined in the project checklist, and was determined to be non-research (see Appendix K). The project received support and permission from GWC (see Appendix L). One of the tenets of the GWConnect is user confidentiality because it was important to our primary stakeholders and to the GWConnect team to create a drug resource that youth can access at any time without fear of being monitored in any way. As a result, GWConnect does not collect any personal data.

This project relates to the Jesuit value of *cura personalis* or care of the whole person: mind, body, and spirit. Preliminary resource and data obtained from the primary stakeholders revealed a lack of available resources relevant to all of the stakeholders' needs. The aim of this project was to design and develop a substance use prevention and treatment resource specifically for youth, as directed by youth, taking a holistic approach to better meet their mind, body, and spiritual needs in a format that they prefer (Ctzejanda, 2019).

This DNP project relates to the American Nurses Association (ANA, 2015) Code of Ethics Provision 1.4 The Right to Self-Determination, which incorporates the ethical principle of autonomy. The DNP student recognized that youth have a right to be active, informed participants and to direct their care, in so far as the law allows. As a result, youth were engaged throughout the entirety of this project. Youth informed the GWConnect team that they overwhelmingly prefer a harm reduction versus abstinence-only approach; therefore, this project is based upon harm reduction principles.

## **Section IV. Results**

Qualitative data were collected through a primary stakeholder focus group and survey prior to the design and development of the GWConnect mobile app. Surveys were also administered prior to and after the GWConnect pilot program. The results of the focus group and surveys are discussed in detail.

### **Youth Focus Group**

An invitation to attend an in-person focus group and provide input on the design of an eHealth drug resource was distributed to local high schools in Spring 2020, with 15 attendees (eight girls and seven boys). Inclusion criteria was anyone aged 12 to 24 years old residing in Nevada or Placer Counties.

When asked about the language that should be used in the eHealth resource, they advised us to:

- Avoid sounding like a school assignment.
- “Don’t sound preachy” by avoiding should/should not statements because they did not want to be told what is good versus bad.
- No drug-shaming or overt or covert shaming for using drugs.
- Include fact-oriented information without any explicit persuasion to not use drugs.
- Use self-help/mindfulness language.
- Invite, rather than tell, the user to use the eHealth resource, thereby encouraging choice/self-determination.
- Preferential to pictures versus words.

When asked how to market this app, they advised us to advertise it in schools and offer some sort of monetary incentive to entice people to use it. They referred us to a website,

DanceSafe.org, that took a similar approach at a music festival; DanceSafe.org representatives offered \$100 to each person who visited their website and signed a pledge to not use drugs during the music festival.

When asked about other resources to model this eHealth resource after, they informed us of Erowid, Psychoactive Vaults, Welcome to the DMT-Nexus, and GritX. We visited the websites and noted that they were easy to navigate, utilized graphics and videos, graphics were colorful and enhanced the drug education content, and the language was informative and non-judgmental.

Other advice we received was to put an inspirational quote on the Home screen, as well as news about drugs, with a link to the full article. They expressed interest in having the capability to bookmark articles of interest in a “My Articles” section. They advised us to have a searchable dictionary of drugs that includes information on the chemical makeup, dosage, side effects, and what the drug does to the body, as well as a lot of pictures of the actual drugs.

Based on this feedback, the search bar was the first feature we built into the eHealth resource, which allows the user to search for anything on the eHealth resource directly from the Home screen. The DNP student built the drug data set based upon their feedback and included all of the aforementioned information, including pictures of the drugs in their various forms from the FDA picture database. The DNP student also researched and uploaded a “How to use naloxone” video on the homepage of the app. The GWConnect team is still working on incorporating a news ticker that crawls across the Home screen, which would highlight current news related to drugs and allow the user to click and access the full article for more information.

The focus group suggested incorporating mindfulness features, such as breathing/meditation, goal tracking, journaling, or mood tracking. The breathing/meditation feature can

include guided meditations, a calming music playlist to choose from, and breathing exercises with visual animation. The DNP student researched and recorded a 6-minute body scan meditation for inclusion in the mindfulness section of the app.

The youth advised us that a goal tracker should allow the user to set their own short- and long-term goals, create a plan and timeline to complete these goals, and the ability to track their progress visually on an appealing graph. The journaling feature should allow for freewriting and the option to choose from writing prompts. They would like to look back at past journal entries that turn like a page in a book and the ability to customize the whole page with pictures, links, or fonts. They would like a mood tracker to pop up when they click on any of the mindfulness features; this pop-up should allow them to rate their mood by clicking on an emoji. The user should be able to view a graph of their mood over time.

Additionally, the youth mentioned they would like the eHealth resource to have social features that allow them to share pictures or video content with captions similar to the “Story” feature on Instagram. Other ideas included: options to remain anonymous or to upload a profile photo and to create their own avatar and username. They would like to view popular or famous users’ profiles who have personal experiences and stories to tell about drug use, addiction, and recovery. Finally, the focus group told us they would like the ability to call a helpline directly from the app, to access information on local rehabilitation facilities, and to chat in real-time with a live medical practitioner.

### **Youth Online Survey**

An online survey was created to gain insight into our primary stakeholders and what they were looking for in an eHealth drug resource. Specifically, what information to include in the drug info guide and on the map view; how to present the information via text, illustration, video,

and audio; and any other input they would like to contribute. The survey was distributed online via social media from May 10-14, 2020, and inclusion criteria was anyone 12 years to 24 years old residing in the United States.

There were 28 respondents. All of the respondents were within the desired age range, with a fairly even distribution between 15 years and 23 years. Almost 90% of the respondents self-identified as female, 7% identified as non-binary/third gender, and only one respondent self-identified as male. Racial and ethnic data were not collected. Twenty out of 28 respondents lived in California. The remainder lived in Maryland, Vermont, Massachusetts, Virginia, Rhode Island, and Wisconsin.

Approximately 35% of respondents felt informed about drugs, their use, and their effects. Almost 72% of respondents looked for or asked someone for information about drugs and their effects. They searched the internet (7/28), YouTube (1/28), and social media (1/28), and they asked their friends (9/28), peers at school (4/28), friends who use drugs (2/28), health teacher (1/28), medical professional (1/28), and a parent (1/28).

The respondents wanted to know the following information about drugs, but were unsure where to look or who to ask:

- drug effects, short- and long-term (4/28);
- how drugs affect the body and what it feels like (4/28);
- drug use within the context of harm reduction (3/28);
- dosages and potency (1/28); and
- physiological effects of recreational drug use (1/28).

The respondents reported the following fears related to drugs: addiction (75%), overdose (75%), “bad trip” (60.7%), injury or death (57.1%), getting in trouble with authority figures/parents (42.9%), peer pressure (32.1%), brain fog (3.6%), and nothing (3.6%).

Youth reported the following information as very important to include in the app: duration of drug effects, short- and long-term side effects, interactions with other substances, addictive nature, precautions and safety for use, and reversal agents/antidotes. The experience of using the drug, photos of drugs, and common street names were important to include, and the scientific names of drugs was not important to include in the app.

The most used substances among our respondents were, in order of usage: marijuana (96.4%), alcohol (92.9%), tobacco (46.4%), cocaine (46.4%), hallucinogens (28.6%), and prescription drugs (28.6%).

They have not found any drug- or alcohol-related resources particularly helpful or informative (6/28). Two respondents felt their school health class was helpful. Two respondents reported searching the internet is helpful. One respondent found the website *Reddit* informative regarding stories about recovery from addiction.

Youth reported hearing about the news from family (85.7%), friends (82.1%), the mainstream media (78.6%), Instagram (67.9%), teachers/other adults (46.4%), TikTok (39.3%), Twitter (32.1%), Facebook (21.4%), Tonight with John Oliver (7.1%), and Wikipedia, Reddit, LinkedIn, and email news subscriptions (3.6%).

Youth enjoyed learning about new things by talking with other people (96.4%), watching shows/videos (57.1%), reading (46.4%), listening to audio books/podcasts (39.3%), interactive activities (e.g., games, quizzes; 28.6%), and watching Tonight with John Oliver (7.1%).

The respondents overwhelmingly use video- and photo-based apps the most, with Instagram and TikTok tied for the most frequently used. They are also heavily into messaging, via native apps and Facebook Messenger. Sixty-four percent downloaded a mindfulness or meditation app, usually motivated by an existing need to manage stress or mental health or help with sleep.

Among social media accounts, there was a mix of relatable celebrities and aspirational lifestyles, with a general theme of kookiness, approachability, and honesty. Overall, the tone of the accounts was hopeful and confessional. Among the artistic accounts they follow, there was an interesting mix of colorful, psychedelic imagery, as well as very simple black and white illustration, often used in a narrative format, such as a comic. Many survey respondents showed a strong affinity for brands that were sustainable, simple, clear, and also nostalgic. The aesthetic of those sites was stark, high-contrast, and relied heavily on colorful products and photography for liveliness.

### **Pilot Program**

Invitations to participate in the GWConnect pilot program were sent via email in February 2021 to the youth focus group participants, youth online survey respondents, Placer and Nevada County high school students, and anyone under 25 years who was receiving services at GWC. A personalized link to download the GWConnect app for pilot testing was emailed to every respondent who completed the pre-pilot survey. The participants were given 80 days to interface with the app and advised to provide feedback in the post-pilot survey.

The pre-pilot survey had 29 respondents, of which 65% resided in Placer County and 27% resided in Nevada County. The mean age was 17.5 years. Eighty-three percent identified as female and 17% identified as male. All of the respondents had access to a mobile device, the vast



majority (97%) with an Apple iOS operating system and a small minority (3%) with a Google Android operating system.

The first question assessed the baseline level of knowledge about drugs, with a mean score of 3.0, standard deviation of 0.87, and variance of 0.76. The second question assessed the likelihood youth would use a mobile app to access information on drugs, with a mean score of 3.45, standard deviation of 1.00, and variance of 1.01. The third question assessed baseline knowledge of drug treatment resources within their community and how to access them, with a mean score of 2.21, standard deviation of 1.03, and variance of 1.06. The final question assessed the likelihood youth would use a mobile app to access information on treatment resources in the local area, with a baseline mean score of 3.72, standard deviation of 1.23, and variance of 1.51.

The post-pilot survey had only 12 respondents, which translates to a 41% completion rate for the pilot program. Seventeen individuals were lost to follow-up, despite sending an email with clear instructions explaining the pilot program process, multiple follow-up emails, and offering an Amazon gift card as an incentive for completion. The mean age of the post-pilot survey respondents was 20 years; 83% identified as female and 17% identified as male. Almost two-thirds of the participants resided in Placer County and one-quarter resided in Nevada County.

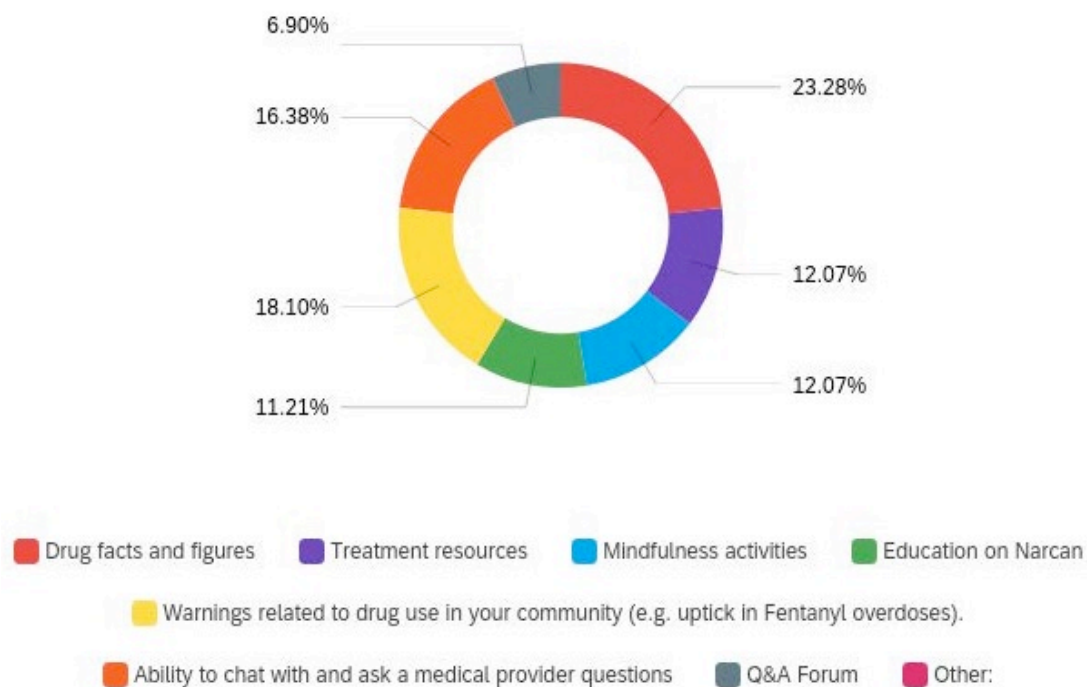
The post-pilot survey demonstrated a 26.47% increase in knowledge about drugs and a 20.32% increase in likelihood they would use a mobile app to access information on drugs. Interestingly, even though the greatest increase was observed in knowledge of drug treatment resources and how to access them (45.83%), there was only a slight increase in the likelihood they would use a mobile app to access information on treatment resources (14.09%). Results of the pre-pilot and post-pilot mean data are displayed in Table 1.

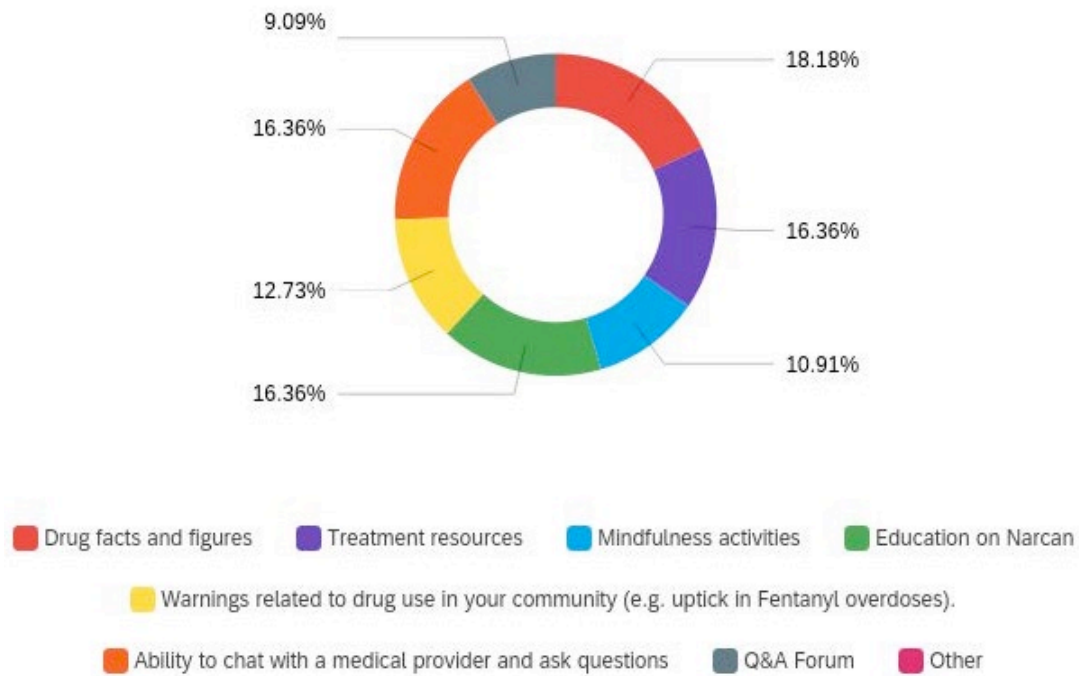
**Table 1***Survey Results*

Survey	Q1	Q2	Q3	Q4
Pre-pilot mean	3.0	3.45	2.21	3.72
Post-pilot mean	4.08	4.33	4.08	4.33
% change	26.47	20.32	45.83	14.09

*Note.* Q denotes survey question number.

The level of importance that youth assigned to each app feature in the pre-pilot survey correlated with the level of usefulness they reported for each feature in the post-pilot survey. These findings indicate that the GWConnect team designed and developed each app feature to suit the needs of the primary stakeholders. Results of the pre-pilot data are displayed in Figure 1, and results of the post-pilot data are displayed in Figure 2.

**Figure 1***Importance of Each App Feature*

**Figure 2***Usefulness of Each App Feature*

Overall, the pilot program participants were satisfied with the GWConnect app, with a mean satisfaction score of 4.75, standard deviation of 0.83, and variance of 0.69. They found GWConnect to be effective in providing information on drugs and local treatment resources, with a mean effective score of 4.58, standard deviation of 0.86, and variance of 0.74. Suggested improvements for the app included different colors, layout and navigation by adding more pages, increase opportunities to interact with the app, and add more mindfulness features.

## **Section V. Discussion**

### **Summary**

The aim of this project was to design and develop an eHealth drug resource that provided culturally-informed harm reduction tools, including unbiased drug information and treatment resources, to reduce the overall prevalence of SUD/OD among rural youth. A pilot program was conducted to determine if the app was effective in delivering evidence-based information on drug and local treatment resources, if youth were satisfied with the app, and if access to the app for up to 80 days resulted in increased knowledge of drugs and treatment resources. The long-term overarching aim of this project is, by increasing access to this information in a format familiar to youth, they will make informed health decisions and seek out help when they need it, thereby reducing the incidence of OUD and deleterious health outcomes, such as overdoses.

Data were collected from youth via an in-person focus group and an online survey in order to determine what youth were looking for in an eHealth drug resource. That data informed the design and development of GWConnect. Key findings from the focus group included a significant emphasis on harm reduction principles and language, unbiased drug information, preference towards pictures over words, and the importance of mindfulness features, such as meditations. The online survey informed the team that youth wanted access to the following information, but were unsure where to look or who to ask: short- and long-term drug effects, how drugs affect the body and what it feels like, drug use within the context of harm reduction, dosages and potency, and the physiological effects of recreational drug use.

### **Interpretation**

The anticipated outcomes of this project included designing and developing an eHealth resource based upon harm reduction principles that would engage youth and result in increased

knowledge of drugs and treatment resources after an 80-day pilot program. Cordova et al. (2020) found that mHealth technology can be used to prevent and reduce health risk behaviors (e.g., substance use and unsafe sexual practices) among adolescents. Scheier et al. (2019) gathered stakeholder input on the design of an online drug prevention program, and the key findings were that the drug prevention content should be presented in an interactive and engaging manner. Mobile health resources have been found to engage youth in preventing health risk behaviors, specifically drug use (Cordova et al., 2018). The findings of this project are comparative to findings from other researchers.

The youth focus group and online survey data informed the design and development of GWConnect. GWConnect was built with four main sections: Home, Information (Info), Help, and Map. Advanced nurse practitioners are particularly well-suited for translating the evidence-based literature for practical application. Therefore, based upon the data collected, the DNP student built the evidence-based drug data set for the Info section of the app, utilizing harm reduction principles without any particular persuasion towards abstinence, including pictures of the drugs in their various forms from the FDA picture database. Commonly abused drugs, such as opioids, hallucinogens, stimulants, depressants, and inhalants, were included, and information on commercial uses, street names, common forms, short-term effects, long-term effects, health-related issues, outcomes of mixing with alcohol, and withdrawal symptoms was provided.

The Home page is the main page, which includes a “How to use naloxone” video that the DNP student researched and uploaded. The DNP student, sensitive to primary stakeholder needs, also researched and recorded a 6-minute body scan meditation that is accessible on the Home page. The Help section offers an opportunity to ask anonymous questions related to substances and substance use, and a GWC clinician will provide an answer. The question and corresponding

answer will be published for any user to view and reference for their own benefit. The final section of the app is a Google maps that has pinned locations for all of the local treatment resources in Nevada and Placer Counties.

Prior to the pilot program, an online survey collected baseline data. Of note, 100% of respondents reported having access to a mobile device with either an Apple or Google Android operating system. The respondents felt moderately knowledgeable about drugs and slightly knowledgeable about treatment resources. They reported being somewhat likely to use a mobile app to access information on both drugs and treatment resources. They ranked the app features as follows, from most to least important: drug facts and figures, warnings related to drug use in the local community (e.g., uptick in fentanyl overdoses), ability to chat with and ask a medical provider questions, treatment resources, mindfulness activities, education on Narcan, and Q&A forum.

The pilot program consisted of a personalized link to download the GWConnect app. The participants were given 80 days to interface with the app and advised to provide feedback in the post-pilot survey. The post-pilot survey demonstrated a 26.47% increase in knowledge about drugs and a 45.83% increase in knowledge of treatment resources. One of the most notable findings was that the level of importance youth assigned to each app feature in the pre-pilot survey correlated with the level of usefulness they reported for each feature in the post-pilot survey. These findings indicated that the GWConnect team designed and developed each app feature to suit the needs of the primary stakeholders.

Overall, the pilot program participants were satisfied with the GWConnect app, and they found it to be very effective in providing information on drugs and local treatment resources.

GWConnect will be published to the Apple and Google app stores as a free download. A longitudinal study is recommended to assess app effectiveness related to health risk behaviors, specifically substance use and SUDs, among youth.

### **Limitations**

The major limitation of this project was the small sample size of participants who completed the pilot program. The pre-pilot survey had 29 respondents; however, the post-pilot survey had only 12 respondents, which translates to a 41% completion rate for the pilot program. Seventeen individuals, accounting for 59% of initial respondents, were lost to follow-up, despite sending an email with clear instructions explaining the pilot program process, multiple follow-up emails, and offering an Amazon gift card as an incentive for completion.

Greater than 20% loss to follow-up threatens the validity of the study results (Dettori, 2011). The various reasons 59% of respondents did not complete the pilot program, albeit unknown, can lead to bias among the final results. There is potential that only respondents who were satisfied with the app completed the program; whereas, those who were dissatisfied with the app did not complete the program.

Interestingly, the vast majority of the pilot program participants were female. There are higher rates of substance use among males versus females; therefore, the gender distribution of the sample size is not representative of substance use among the general population (National Institute on Drug Abuse, 2021). Follow-up studies with larger sample sizes, more representative of the larger population, and more robust follow-up protocols can minimize and adjust for this limitation.

Another expected limitation is related is that GWConnect was designed specifically for youth 12 years to 24 years old in Nevada and Placer Counties. As a result, the findings of the

pilot program are not generalizable to a larger population. GWConnect will be available for anyone to download from the Apple and Google stores; however, future research is needed to assess its effectiveness among youth in other geographic locations.

There were only modest increases in the scores related to the likelihood youth would use the mobile app to access information on drugs and treatment resources, indicating room for improvement in the app. However, the respondents offered few suggestions for improvement. Suggested improvements included changing the colors, increasing the app interactivity, improving the layout and usability by adding pages or tabs, and adding more mindfulness features.

The final barrier to implementation is publishing GWConnect to the Apple and Google app stores. The app developer will submit GWConnect to the app stores for review, with the required fees, and upon approval, the app will be published for free download.

### **Conclusions**

Opioid use/misuse is a leading cause of injury and death among adolescents and young adults in the United States (Hudgins et al., 2019). Opioid misuse also correlates with misuse of other substances, which exponentially increases health risks over time. The most effective treatment for OUD among adolescence is through effective prevention interventions that either preclude the development of the OUD or enable timely diagnosis and treatment in order to prevent poor health outcomes. eHealth technologies have been shown to effectively prevent and treat other chronic diseases, and recent research has reported results supporting the use of eHealth technologies to prevent and/or treat SUDs among youth (Cordova et al., 2018, 2019, 2020; Nuamah et al., 2020).



Designing and developing eHealth technologies specifically for the management of OUD could eliminate a barrier to MAT treatment by allowing the patient the ability to communicate with a medical provider, track his or her symptoms, and access evidence-based information and reliable resources related to OUD. This technology could be particularly useful among youth due to their familiarity with and affinity towards using technology in their everyday lives.

The pilot program of the eHealth technology, GWConnect, designed and developed in this project, found the app to be effective in increasing youth knowledge of drugs and treatment resources in their local area and effective in increasing their likelihood of using the app to access the aforementioned information. Youth also reported high levels of satisfaction and app effectiveness in delivering the information it set out to deliver. GWConnect will now be submitted for publication to the Google and Apple app stores as a free download.

The app was built upon harm reduction, rather than the traditional abstinence-only prevention, since research has shown these principles are the most relevant to today's youth (Jenkins et al., 2017). Increased knowledge can empower youth to make informed decisions preventing SUD and/or reducing harm related to risky behaviors. Increased knowledge of treatment resources can improve timeliness of treatment initiation and reduce harm associated with untreated SUD.

The overarching aim of GWConnect is to reduce the incidence of OUD and overdose among rural youth in Northern California; therefore, future longitudinal research is needed to assess its effectiveness over a period of time. User data from Google and Apple can also be utilized to drive future updates and potentially inform the development of an app that would be relevant and applicable to a broader audience.

## **Section VI. Other Information**

### **Funding**

There are no conflicts of interest to disclose. There were no additional outside funding sources provided for this quality improvement project, other than the YOR California grant and the DNP student's personal contributions for the Amazon ecards.

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## **Section VIII: Appendices**

**Appendix A. Johns Hopkins Nurse Evidence-Based Evaluation Table**

<b>Citation</b>	<b>Purpose</b>	<b>Research Design</b>	<b>Methodology</b>	<b>Findings</b>	<b>Conclusion</b>	<b>Critical Appraisal Tool &amp; Rating</b>
Cordova et al., 2018	Assessed the usability and acceptability of a mobile health (mHealth) app among adolescents and its effect on health risk behaviors, specifically drug use, condomless sex, and STI/HIV testing.	Multiple-methods approach. Purposive sampling of 30 adolescents (13-22 years), predominantly African American and female, in Southeast Michigan. Quantitative and qualitative usage data of a mHealth resource was collected from July to September 2015.	An mHealth preventive intervention was designed in collaboration with a Youth Leadership Council. The adolescents were asked to fill out a demographics questionnaire and health risk behavior assessment questionnaire, test the mHealth resource on iPads, complete modules to assess usability, and participate in either a focus group or individual interview to discuss the overall experience.	Pre-assessment data revealed that 36% of adolescents self-reported illicit drug use within the past 90 days, and 71% of adolescents self-reported engaging in sexual activity within the past 90 days. Post-assessment data revealed adolescents reported high levels of usability and acceptability of the mHealth intervention.	Adolescents found that the online risk assessment was a great way to initiate a conversation about sensitive subjects related to health risk behaviors with their medical provider. The mHealth resource provided access to information on drugs that adolescents found to be helpful, increased their knowledge, and gave them tools to use in order to make informed decisions. Overall, adolescents found the mHealth resource to be helpful in engaging them in preventing health risk behaviors,	Level III Good Quality

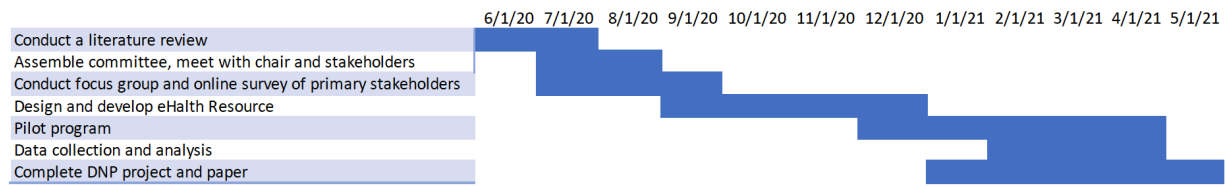
Citation	Purpose	Research Design	Methodology	Findings	Conclusion	Critical Appraisal Tool & Rating
					specifically related to drug use and sexual practices.	
Cordova et al., 2019	Assessed feasibility and accessibility of Storytelling 4 Empowerment, a mobile app aiming to prevent substance use and STI/HIV.	This multi-method study design utilized community- based participatory research principles (CBPR) to engage both medical clinicians and youth.	The use of S4E was evaluated among medical clinicians and youth focusing on improving the communication between them, as well as reducing health risk behaviors among youth.	The data suggested that S4E facilitated communication between youth and clinicians, as well as prevention approaches.	High levels of feasibility and accessibility were reported by both the clinicians and the youth.	Level III Good Quality
Cordova et al., 2020	Mobile health (mHealth) technology can be used to prevent and reduce health risk behaviors (e.g., substance use and unsafe sexual practices) among adolescents.	Storytelling 4 Empowerment (S4E) was evaluated for its effect on health behavior change among youth. S4E consists of three interactive online modules on alcohol and drug use, and STI/HIV.	50 youth (13-21 years) were randomized to either the S4E arm or the standard care arm with a pre-assessment, post-assessment, and 30-day post-assessment.	Youth in the S4E arm demonstrated a reduction in health risk behavior over the past 30 days, including substance use, as well as increased knowledge of prevention strategies.	mHealth technology can be utilized to reduce substance use and other health risk behavior among youth.	Level I Good Quality
Scheier et al., 2019	Assessed stakeholder input on the design of an online family-based drug prevention	This mixed-methods study was a Phase I NIH-funded Small Business Innovative Research grant. The	They conducted interviews with prevention and online learning experts and family services personnel.	The principal findings revealed that the online program should include the drug prevention content	This study informed the design and development of curriculum for an online family-based drug prevention	Level III Good Quality

<b>Citation</b>	<b>Purpose</b>	<b>Research Design</b>	<b>Methodology</b>	<b>Findings</b>	<b>Conclusion</b>	<b>Critical Appraisal Tool &amp; Rating</b>
	program called Strengthening Families Program (SFP). The in-person format has proven to be effective in preventing youth drug and alcohol use, but that delivery method requires a lot of resources.	study engaged subject-matter experts and stakeholders in the design of the online SFP.	They also surveyed and conducted 10 focus groups with 85 adults.	in an interactive and engaging manner. There was an emphasis placed on brief skills-oriented sessions, graphics over text, animation, real-life role play scenarios, connection with agency personnel who can monitor progress, and printable materials to work on at home.	program based upon what the family wants to learn, in the preferred delivery format, and with features that facilitate engagement and retention.	
Schuman-Olivier et al., 2018	Assessed the feasibility, usability, and acceptability of MySafeRx, a mobile resource developed to promote buprenorphine/naloxone treatment adherence.	28-day single-arm observational study of use of MySafeRx resource among early adults (18-39 years) receiving buprenorphine/naloxone for treatment of opioid use disorder.	The MySafeRx technology incorporates motivational mentorship, ability to message your medical provider, and medication monitoring.	Illicit opioid abstinence increased by 53% during the 28-day trial period. Participants reported good levels of usability and acceptability of the MySafeRx technology.	The MySafeRx, or other similar mobile technology, can be used to increase adherence to opioid use disorder treatment.	Level III Good Quality

## Appendix B. Gap Analysis

### Gap Analysis

<b>Project Name</b>	Development of an eHealth Harm Reduction Resource to Address Opioid Use Among Youth in Rural Northern California	
<b>Date</b>	May 2021	
<b>Project Aim</b>	The overarching aim is to reduce the incidence of OUD and OD among rural youth in Northern California. The project goal is the development and implementation of an eHealth intervention by May 2021 that will provide culturally-informed harm reduction tools (e.g., unbiased drug information, Narcan information, news alerts, “ask a provider” feature, and referral resources to reduce the prevalence of SUD/OUD among rural youth.	
<b>Current State</b>	<b>Best Practice</b>	<b>Proposed Solution</b>
<b>Limited knowledge of evidence-based information on drugs and available treatment resources resulting in an underserved adolescent population with or at-risk of developing an OUD.</b>	Access to evidence-based information on drugs and available treatment resources within a rural Northern California community in order to improve knowledge about drugs and use/misuse, as well as awareness of and how to access the available treatment resources within the local area.	Design and develop an eHealth drug resource specifically for the adolescent population within this rural Northern California community, publish it to the Google and Apple store for free download, and incorporate it into treatment protocols for youth with OUD at Granite Wellness.

**Appendix C. GANTT Chart**

## **Appendix D. Work Breakdown Structure**

### **1.0 Design**

- 1.1 Develop Project Scope
- 1.2 Gap Analysis
- 1.3 Develop Objectives
- 1.4 Identify Key Stakeholders
- 1.5 Develop Project Charter
- 1.6 Submit Project Charter

### **2.0 Plan**

- 2.1 Identify Project Team
- 2.2 Discussion of Roles
- 2.3 Develop Project Plan
- 2.4 Develop WBS
- 2.5 Develop Focus Group Questionnaire Surveys

### **3.0 Intervention**

- 3.1 Conduct Focus Group
- 3.2 Conduct Online Survey
- 3.3 Design & Develop Granite Connects App
  - 3.3.1 Build Evidence-based Drug Data Set
    - 3.3.1.1 Research
    - 3.3.1.2 Consult with Personnel Familiar with Harm Reduction Principles
  - 3.3.2 Record Guided Body Scan
- 3.4 Pilot Program
  - 3.4.1 Administer Pre- and Post-testing Surveys

### **4.0 Results**

- 4.1 Analyze Survey Findings
  - 4.1.1 Summarize Findings and Write Recommendations

### **5.0 Evaluation**

- 5.1 Review Survey Feedback
- 5.2 Write Final Report
- 5.3 Dissemination
  - 5.3.1 DNP Paper
  - 5.3.2 DNP Presentation



**Appendix E. Communication Matrix**

<b>Information</b>	<b>Audience</b>	<b>When</b>	<b>Communication Method</b>
<b>DNP project development, implementation, and status updates</b>	DNP Chair, GWConnect team	Weekly	Email, Zoom, Dashboard, Slack
<b>DNP project milestones and revisions</b>	DNP Chair and Committee Member	Monthly	Email, Zoom
<b>DNP project hurdles</b>	DNP Chair	As needed	Email, Zoom

## Appendix F. SWOT Analysis

**STRENGTHS**

- The vast majority of youth are familiar with and have ready access to mobile technologies.
- Youth usually have some sort of mobile technology with them most of the time making a mobile app an ideal intervention to use in this population.
- Mobile technologies have been successfully used to prevent and manage other chronic diseases.
- During the COVID-19 pandemic, people have become more reliant on mobile technologies to connect virtually due to limitations on in-person interactions.
- Increased knowledge can facilitate informed decision making during youth that can prevent opioid use disorder.
- App design and development based upon primary stakeholder data obtained via focus group and online survey.
- The app is designed and developed for youth 12-24 years in Nevada and Placer Counties
- Funding through the YOR CA grant.
- Buy-in by the GWC administration.

**WEAKNESSES**

- The app is designed and developed for youth 12-24 years in Nevada and Placer Counties; Youth in other Counties may not find it applicable to them.
- Ability to get youth to download and use the app.
- The app requires a medical provider to answer any questions that are asked requiring frequent monitoring of the app in order to provide a response in a timely manner.
- The app requires updates regarding news related to drugs, use, and warnings in the local area.
- The app will require updates to remain compatible with Android and iOS operating systems.
- Cost of maintaining and updating the app over time.

**OPPORTUNITIES**

- Initial research revealed that there is not a comparable app on the market currently.
- Primary stakeholders reported what they were looking for in an eHealth resource through the focus group and online survey, and that data gave the team the opportunity to design and develop the app specifically for the primary stakeholders.
- Opportunity to connect with youth in a medium that they prefer, are familiar with, and have ready access to.
- Ability to remain connected with youth even during the COVID-19 pandemic when in-person interactions are limited.
- Youth will have the opportunity to access evidenced-based information on drugs, treatment resources, and ask a medical provider questions in a secure, confidential, and non-confrontational manner.
- Dispel common myths about drugs and drug use.
- Prevent OUD amongst youth in Northern California.

**THREATS**

- App buy-in by youth.
- Youth may have a fear that their parents/guardians or the app administrator(s) are monitoring their activity, and simply accessing drug information could be perceived as thinking about or actually using drugs.
- Parents/guardians having a misperception that allowing youth to access information will make them more apt to use drugs.
- Concern that the YOR CA grant funding may not be renewed.

**Appendix G. 3-Year Proforma****Design, Development, Distribution, and  
Maintenance of GWConnect**

	Year 1	Year 2	Year 3
<b>Grant Funding</b>	\$500,000	\$515,000	\$530,450
<b>Deductions from Revenue</b>	0	0	0
<b>Total revenue</b>	\$500,000	\$515,000	\$530,450
<b>NP wages (0.5 NP FTE)</b>	\$56,737	\$58,439	\$60,192
<b>App Design &amp; Development (0.5 App Developer FTE in Years 2 &amp; 3)</b>	\$25,000	\$36,987	\$38,096
<b>Total wages</b>	\$81,737	\$95,426	\$98,288
<b>Supplies</b>	\$100	\$103	\$106
<b>Total Expenses</b>	\$81,837	\$95,529	\$98,394
<b>Revenue less expenses</b>	\$418,163	\$419,471	\$432,056

**Appendix H. Return on Investment Analysis**

<b>Cost of GWConnect App</b>	<b>Cost Savings/Avoided Expenses</b>	<b>Balance</b>
<b>(\$81,837)</b>	\$1.3 million per fatal overdose	\$1.2 million
<b>(\$81,837)</b>	\$176.8 million fatal overdoses per day	\$176.7 million

## Appendix I. Pre-Pilot Program User Survey

### Granite Wellness Connects eHealth Resource Survey #1

Q1 What state do you reside in?

☐ California

☐ Other: \_\_\_\_\_

Q2 What county do you reside in?

☐ Placer

☐ Nevada

☐ Other: \_\_\_\_\_

Q3 How old are you?

☐ Age in years: \_\_\_\_\_

☐ Click to write Choice 2

☐ Click to write Choice 3

Q4 What is your gender?

☐ Male

☐ Female

☐ Non-binary / third gender

☐ Prefer not to say

Q5 Does your smartphone have a Google Android or an Apple iOS operating system?

☐ Google Android

☐ Apple iOS

☐ Other: \_\_\_\_\_

Q6 How knowledgeable do you feel about drugs?

☐ Extremely knowledgeable

☐ Very knowledgeable

☐ Moderately knowledgeable

☐ Slightly knowledgeable

☐ Not knowledgeable at all

Q7 How likely are you to use a mobile app to access information on drugs?

☐ Extremely likely

☐ Somewhat likely

☐ Neither likely nor unlikely

☐ Somewhat unlikely

**Granite Wellness Connects eHealth Resource Survey #1**

☐ Extremely unlikely

Q8 What features are important to include in a mobile app containing information on drugs and related resources?

☐

Drug facts and figures

☐

Treatment resources

☐

Mindfulness activities

☐

Education on Narcan

☐

Warnings related to drug use in your community (e.g. uptick in Fentanyl overdoses).

☐

Ability to chat with and ask a medical provider questions

☐

Q&A Forum

☐

Other: \_\_\_\_\_

Q9 If you or someone you know needed help for drug use/misuse, how knowledgeable are you regarding where resources are in your local area and how to access them?

☐ Extremely knowledgeable

☐ Very knowledgeable

☐ Moderately knowledgeable

☐ Slightly knowledgeable

☐ Not knowledgeable at all

Q10 How likely are you to use a mobile app to access information on treatment resources in your local area?

☐ Extremely likely

☐ Somewhat likely

☐ Neither likely nor unlikely

☐ Somewhat unlikely

☐ Extremely unlikely

Q11 There is one, brief follow-up survey that will be emailed to you after you have trialed the Granite Connects app. What is your email address?

☐ Email address: \_\_\_\_\_

☐ Click to write Choice 2

☐ Click to write Choice 3

## Appendix J. Post-Pilot Program User Survey

### Granite Wellness Connects eHealth Resource Survey #2

Q1 What state do you reside in?

☐ California

☐ Other \_\_\_\_\_

Q2 What county do you reside in?

☐ Placer

☐ Nevada

☐ Other \_\_\_\_\_

Q3 How old are you?

☐ Age in years: \_\_\_\_\_

Q4 What is your gender?

☐ Male

☐ Female

☐ Non-binary / third gender

☐ Prefer not to say

Q5 After beta testing the Granite Connects app, how knowledgeable do you feel about drugs?

☐ Extremely knowledgeable

☐ Very knowledgeable

☐ Moderately knowledgeable

☐ Slightly knowledgeable

☐ Not knowledgeable at all

Q6 After beta testing the Granite Connects app, how likely are you to use this app in order to access information on drugs?

☐ Extremely likely

☐ Somewhat likely

☐ Neither likely nor unlikely

☐ Somewhat unlikely

☐ Extremely unlikely

Q7 After beta testing the Granite Connects app, which feature(s) did you find informative and/or useful?

☐

Drug facts and figures

☐

Treatment resources

**Granite Wellness Connects eHealth Resource Survey #2**

- ☐ Mindfulness activities
- ☐ Education on Narcan
- ☐ Warnings related to drug use in your community (e.g. uptick in Fentanyl overdoses).
- ☐ Ability to chat with a medical provider and ask questions
- ☐ Q&A Forum
- ☐ Other \_\_\_\_\_

Q8 After beta testing the Granite Connects app, how knowledgeable are you regarding drug treatment resources are in your local area and how to access them?

- ☐ Extremely knowledgeable
- ☐ Very knowledgeable
- ☐ Moderately knowledgeable
- ☐ Slightly knowledgeable
- ☐ Not knowledgeable at all

Q9 After beta testing the Granite Connects app, how likely are you to use it in order to access information on treatment resources in your local area?

- ☐ Extremely likely
- ☐ Somewhat likely
- ☐ Neither likely nor unlikely
- ☐ Somewhat unlikely
- ☐ Extremely unlikely

Q10 How satisfied are you with the Granite Connects app?

- ☐ Extremely satisfied
- ☐ Somewhat satisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Extremely dissatisfied

Q11 How effective is the Granite Connects app in providing information on drugs and local resources?

- ☐ Extremely effective



**Granite Wellness Connects eHealth Resource Survey #2**

☐ Very effective

☐ Moderately effective

☐ Slightly effective

☐ Not effective at all

Q12 What improvements can be made to the Granite Connects app?

☐ Click to write improvement 1 \_\_\_\_\_

☐ Click to write improvement 2 \_\_\_\_\_

☐ Click to write improvement 3 \_\_\_\_\_

Q13 What is your email address?

☐ Email address: \_\_\_\_\_

## Appendix K. DNP Statement of Non-Research Determination Form



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### Doctor of Nursing Practice Statement of Non-Research Determination (SOD) Form

*The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E*

#### General Information

<b>Last Name:</b>	<u>Lake</u>	<b>First Name:</b>	<u>Carolyn</u>
<b>CWID Number:</b>	<u>20454393</u>	<b>Semester/Year:</b>	<u>Spring 2021</u>
<b>Course Name &amp; Number:</b>	<u>N789 DNP Project</u>		
<b>Chairperson Name:</b>		<b>Second Reader:</b>	
	<u>Dr. Alexa Curtis</u>		<u>Dr. Trinette Radasa</u>

#### Project Description

- Title of Project:** An Innovative Approach to Prevent and Treat Opioid Use Disorder Amongst Youth in a Rural Northern California Community through the Development of an eHealth Resource

- Brief Description of Project** (Clearly state the purpose of the project and the problem statement in 250 words or less):

The purpose of this project is to improve youth knowledge of drug-related information and available treatment resources in an underserved non-metropolitan community in northern California by designing and developing an eHealth drug resource.

- AIM Statement: What are you trying to accomplish?**

By May 2021, Granite Wellness Centers will design, develop and publish a free eHealth drug resource to the Google and Apple stores for youth, 12-24 years, to download and utilize, and to incorporate the use of this eHealth resource into their prevention and treatment protocols for youth with, or at risk for, OUD.

- Brief Description of Intervention** (150 words):

DNP student will contribute to the design and development of an eHealth drug resource by serving as a subject-matter expert and communications liaison between team members and stakeholders involved in the project. The eHealth resource will be pilot tested. Each individual piloting the app will complete a pre and post survey to assess knowledge of drugs and available local resources, as well as behaviors related to drug use.

**4a. How will this intervention be implemented?**

My project will be implemented at Granite Wellness Centers (GWC). Formerly known as Community Recovery Resources, GWC is a nonprofit 501(c)(3) corporation that has been providing drug and alcohol treatment in Northern California since 1974. The GWC has six locations throughout Nevada and Placer Counties. The focus of the intervention is youth ages 12-24 years in rural Northern California communities. Stakeholder and participants will be informed about the project and the intervention through email, zoom, and social media communications.

**5. Outcome measurements: How will you know that a change is an improvement?**

The effectiveness of this DNP project will be observed by increased knowledge of evidence-based drug information and what local resources are available and how to access them, if needed. Demographic data will be gathered via survey, but participant confidentiality will be maintained.



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### DNP Statement of Determination

#### Evidence-Based Change of Practice Project Checklist\*

*The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E*

#### Project Title:

An Innovative Approach to Prevent and Treat Opioid Use Disorder Amongst Youth in a Rural Northern California Community through the Development of an eHealth Resource

Mark an "X" under "Yes" or "No" for each of the following statements:	Yes	No
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and <b>is a part of usual care</b> . <u>All</u> participants will receive standard of care.	X	
The project is <b>not</b> designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does <b>not</b> follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does <b>not</b> develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does <b>not</b> seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has <b>no</b> funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., <b>not</b> a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: <i>"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."</i>	X	

#### Answer Key:

- If the answer to all of these items is "Yes", the project can be considered an evidence-based activity that does **not** meet the definition of research. IRB review is not required. Keep a copy of this checklist in your files.
- If the answer to any of these questions is "No", you must submit for IRB approval.

\*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: <http://answers.hhs.gov/ohrp/categories/1569>



UNIVERSITY OF  
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School of Nursing and  
Health Professions

### DNP Statement of Determination Evidence-Based Change of Practice Project Checklist Outcome

*The SOD should be completed in NURS 7005 and NURS 791E/P or NURS 749/A/E*

☒ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). **Student may proceed with implementation.**

☐ This project involves research with human subjects and **must be submitted for IRB approval before project activity can commence.**

**Comments:**

<b>Student Last Name:</b>	<u>Lake</u>	<b>Student First Name:</b>	<u>Carolyn</u>
<b>Student Signature:</b>	<u></u>	<b>Date:</b>	<u>2/20/2020</u>
<b>Chairperson Name:</b>	<u>Dr. Alexa Curtis</u>		
<b>Chairperson Signature:</b>	<u></u>	<b>Date:</b>	<u></u>
<b>Second Reader Name:</b>	<u>Dr. Trinetta Radasa</u>	<b>Date:</b>	<u></u>
<b>Second Reader Signature:</b>	<u></u>		
<b>DNP SOD Review Committee Member Name:</b>	<u></u>		
<b>DNP SOD Review Committee Member Signature:</b>	<u></u>	<b>Date:</b>	<u></u>

## Appendix L. Letter of Support

22 February 2021

To Whom It May Concern:

This is a letter of support for Carolyn Perrotti Lake to implement her DNP Comprehensive Project, An Innovative Approach to Prevent and Treat Opioid Use Disorder Amongst Youth in a Rural Northern California Community through the Development of an eHealth Resource, at Granite Wellness Centers.

We give her permission to use the name of our agency in her DNP Comprehensive Project Paper and in future presentations and publications.

Thank you,

Alexa Curtis  
Nurse Practitioner  
Granite Wellness Centers  
[www.granitewellness.org](http://www.granitewellness.org)

**Appendix M. Youth Focus Group Findings**

Who is the target audience?	
Age	12 - 24 years old
Location	Nevada and Placer Counties
Interested in	Prevention and early treatment for opioid use disorder
	Learning more about substance abuse
	The effects of drugs on the body
	Information on how/where to access to treatment
What language should be used?	Avoid using “my---”
	Avoid sounding like a school assignment
	Don’t sound “preachy” (no should/shouldn’t, *kids don’t want to be told again what’s good/bad*)
	Give fact-oriented information (no explicit persuasion to not use drugs)
	Use self-help/mindfulness language (let the user choose to use the app for their own well-being)
	More pictures than words
	No drug shaming!
Marketing Ideas	Market through schools
	“\$100” tactic by dance safe
Resources to model after	
	Erowid Psychoactive Vaults
	Welcome to the DMT-Nexus
	GritX
	DanceSafe.org
Feature Ideas	
Front page	Inspirational quote
	News about drugs, articles about new studies, and the option to bookmark news articles and keep in “my articles”
	Picture, caption, truncated content + link to article
Dictionary of drugs	
	Information on the chemical makeup, scientific explanation of what happens to your body, dosage, and side effects of the drug (dangers and possible consequences)
	Searchable, with filters and alphabetic sorting
	Lots of pictures, easy to read
	Able to bookmark into “my articles”



Mindfulness features	Breathing/meditation <ul style="list-style-type: none"> <li>■ Can embed a playlist</li> <li>■ Has breathing animation</li> <li>■ Able to choose length of time</li> </ul>
	Goal tracker <ul style="list-style-type: none"> <li>■ Can set your own mega goal</li> <li>■ Add micro-achievements that contribute to your goal</li> <li>■ Have a calendar to set a time to complete the goal</li> <li>■ Track progress on a visually appealing graph</li> </ul>
	Journal <ul style="list-style-type: none"> <li>■ Ability to choose from prompts, bullets, or free journal</li> <li>■ Looking at past journal entries turns like a page,</li> <li>■ Ability to customize the whole page (pictures, links, fonts etc.)</li> </ul>
	Mood tracker <ul style="list-style-type: none"> <li>■ Click on an emoji to rate how you are feeling</li> <li>■ Opens when you click on mindfulness features</li> <li>■ Chart to show your moods</li> </ul>
Social features	
	Share mainly pictures/ video content with captions
	Possible “story” (like Instagram stories) feature
	Able to be anonymous <ul style="list-style-type: none"> <li>■ Make own avatar</li> <li>■ Choose own username</li> </ul>
	Able to upload a profile photo
	Popular/famous users have public stories to view by everyone
	Integrated blogs/stories from famous people who have gone through recovery/ have a good story to tell about drugs
Access to resources	
	Page to immediately call a helpline
	References to local recovery care facilities
	Ability to chat with a practitioner live
	Option to make an anonymous call/chat



### Appendix N. Youth Online Survey

#### App survey

Thanks for agreeing to take this survey. It'll take about 5 minutes, and your responses are totally anonymous.

**\* Required**

Which state do you live in? \*

Choose ▼

How old are you? \*

Choose ▼

What is your gender?

☐ Female

☐ Male

☐ Non-binary / third gender

☐ Prefer not to say

☐ ...

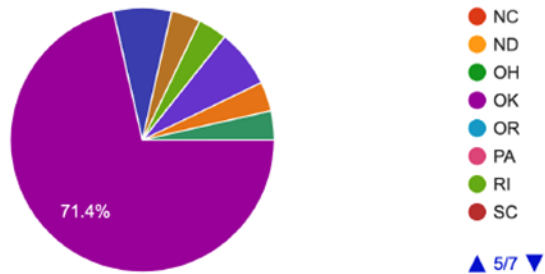
## Appendix O. Youth Online Survey Findings

## Youth Online Survey Findings

## Demographics

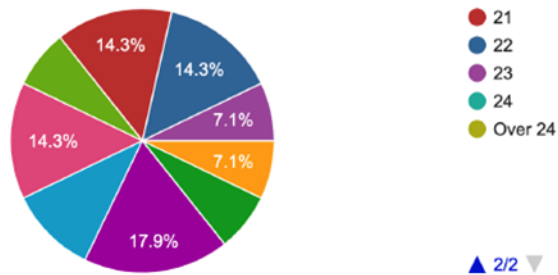
Which state do you live in?

28 responses



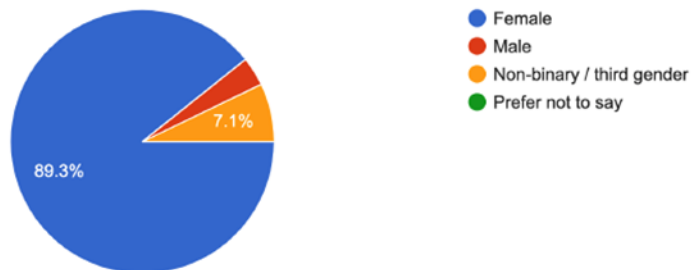
How old are you?

28 responses



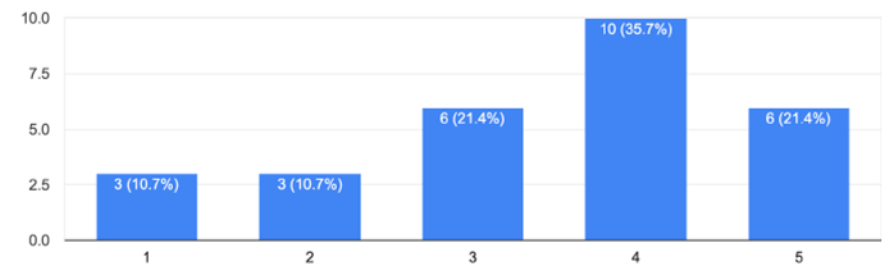
What is your gender?

28 responses

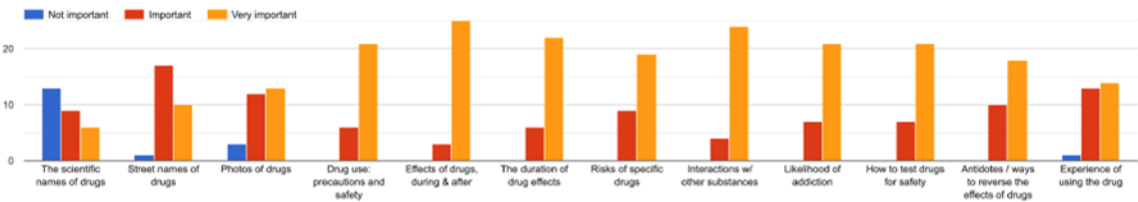


## Drug-related insights

How informed do you feel about drugs, their use, and their effects?  
28 responses



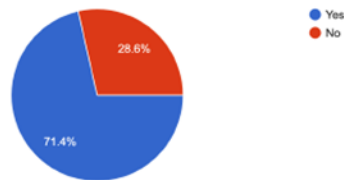
Rate the following drug info based on how important you think it is to know.



- As ranked by our respondents, the most important information to know about a drug is:

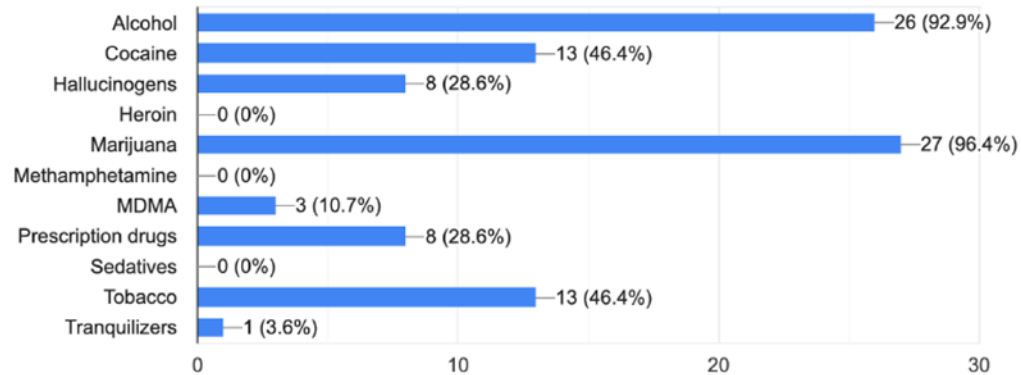
Very important	Important	Not important
Effects of drugs, during & after	Experience of using the drug	The scientific names of drugs
Interactions with other substances	Photos of drugs	
The duration of drug effects	Street names of drugs	
Likelihood of addiction		
How to test drugs for safety		
Precautions and safety for use		
Risks of specific drugs		
Antidotes / ways to reverse the effects of drugs		

Have you ever looked for or asked somebody for information about drugs and their effects?  
28 responses



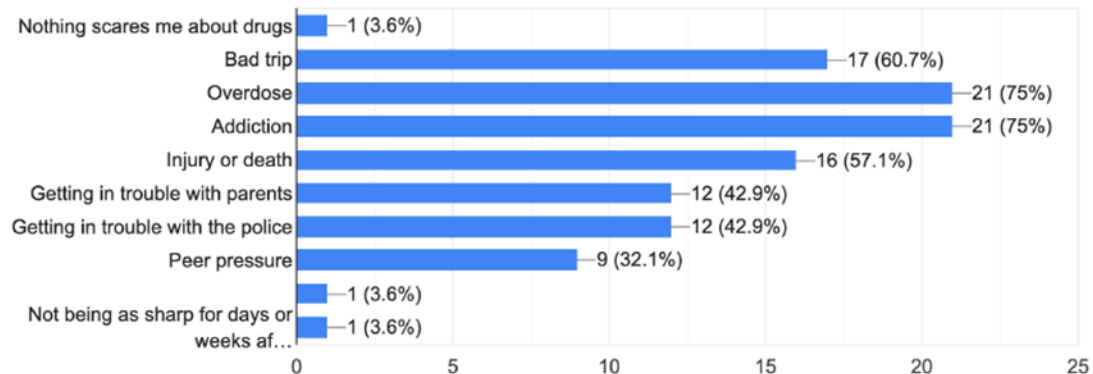
<b>If yes, where did you look / who did you ask?</b>
Online and also asked my stepmom
Internet
friends
Friends
peers at school
I asked my fellow peers
friends and online
peers at school
My friends, the internet
Friends, the internet
Friends
Friends and the Internet
Friends
Friends and the Internet
peers or youtube
My friends that do drugs
Doctors or people who've used drugs
Informed adults, media
Online, health teacher
<b>What do you want to know about drugs but don't know where or who to ask?</b>
how do drugs effect your mind like what happens to you mentally when you take drugs.
what it feels like, dosage for certain ones
How does it feel to be on certain drugs
I feel like recreational drug use does not have a significant amount of research behind it in terms of the physiological consequences. Also, recreational drug use (like smoking marijuana) is fairly common. However, what does a healthy relationship with a recreational drug look like? How do you know the potency of the drug you are consuming? What are the effects of long term use?
How to use safely
How to use safely
what are the long term affects of drugs like painkillers
I want to know more about acid and dmt

What do you think are the most frequently used drugs among your friends and classmates?  
28 responses



- The most commonly used substances among our respondents are, in order:
  - Marijuana
  - Alcohol
  - Tobacco
  - Cocaine
  - Hallucinogens
  - Prescription drugs

Is there anything about drugs that scares you? What?  
28 responses



Are there any drug or alcohol-related resources that you've found particularly helpful or informative? Which ones?

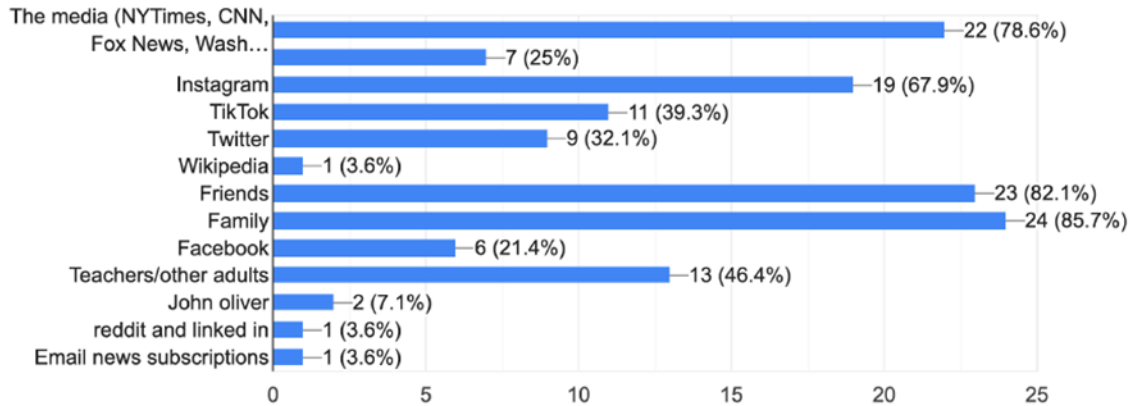
My school health program and just online resources
drug websites
i don't have any resources
I don't have resources
Reddit! There are a lot of subreddits devoted to posting stories about people's recovery from addiction
Health class
Not really
no certain site in particular
No
Not really

---

## App insights

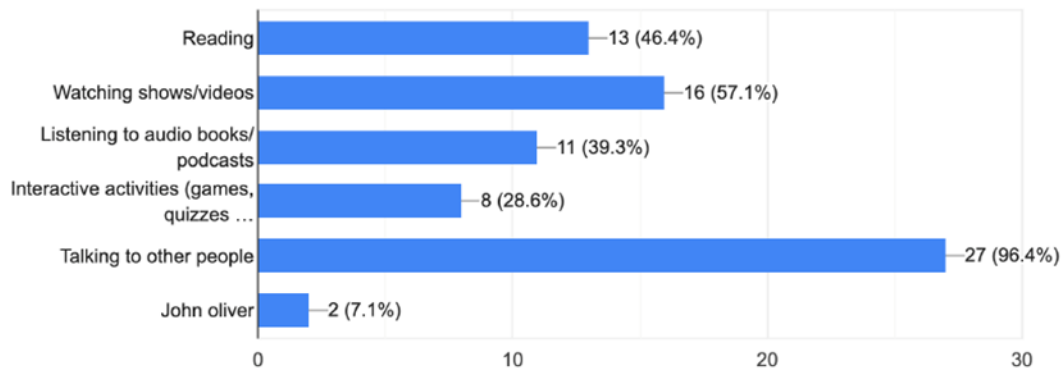
Where do you hear about the news?

28 responses

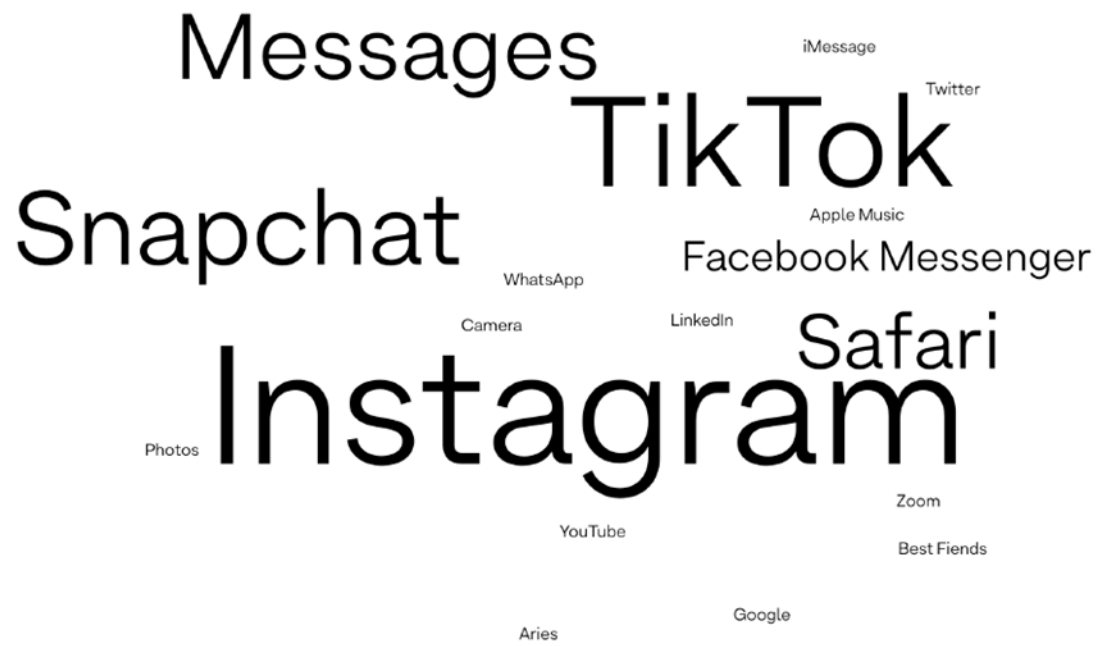


What's your favorite way to learn about new things?

28 responses



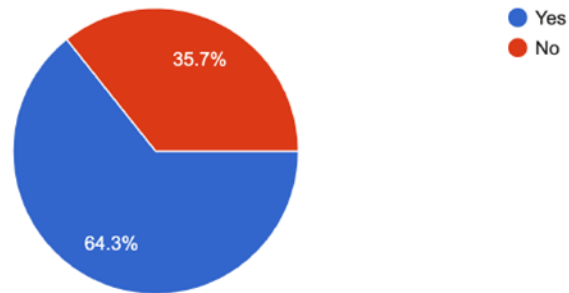
What are your most-used apps?





Have you ever downloaded or used a meditation or mindfulness app?

28 responses



**If you have, what was the reason you downloaded the app at first?**

To destress/wind down

depression

To help with anxiety

for kinesiology

Because I thought it would be a good way to get my mind in the right place

anxiety

for kinesiology

To help with anxiety

Trouble sleeping

To help me sleep

To sleep better

To help me sleep

To do yoga workout

As therapy for my concussion

therapist recommended it for anxiety

I was going through a traumatic event

To see if it would help my mental health

What are the most creative Instagram accounts you follow?

*Note: there was literally zero overlap here.*

<a href="#">humansofny</a>	<a href="#">Kimberly Drew</a>	<a href="#">Pussywitch</a>	<a href="#">mykie</a>
<a href="#">thelastartistever</a>	Arch Digest	Lydia petitt	<a href="#">billie eillish</a>
Boy Soda	<a href="#">Beverlysalas</a>	<a href="#">Csuggsillustration</a>	sludgetank
Gabriel Forcadilla	<a href="#">@butlikemaybe</a>	<a href="#">lianafinck</a>	mollymatalon
<a href="#">nicoleetait</a>	<a href="#">Shane Dawson</a>	<a href="#">fuckjerry</a>	snoop dogg
<a href="#">bloomassembly</a>	Mia Oliveira	<a href="#">Matthew Gray Gubler</a>	<a href="#">summermckeen</a>
<a href="#">Nikita dragun</a>	Hailey Cruise	<a href="#">Garrett Watts</a>	<a href="#">yesimhotinthis</a>
Marley porter	Emma coburn	Kayla Willson	<a href="#">Freda chiu</a>
<a href="#">maddie castellano</a>	Hazel Findlay	Colleen quigley	<a href="#">Rachel suggs</a>
marley porter	<a href="#">bailey sarian</a>	Lizz Giden	<a href="#">fluff.faun</a>
<a href="#">Indy blue</a>	thankyou_ali	<a href="#">Indya Moore</a>	shooglet
<a href="#">Mmmmmitchell</a>	Earth	<a href="#">Carrot Quinn</a>	<a href="#">Marley.t.film</a>

What's a brand or online store that you think is particularly cool?

American Eagle	Tillys	Urban Outfitters
Billabong	the earthling co.	Nike
tigerlily	Girlfriend Collective	All brands kind of suck
Nectar online store	Cult Gaia	Ordinary
vans	Everlane	Eckhaus latta
the earthling co.	Sierra Nevada	Urban outfitters
Tillys	Depop	Etsy
Nasty gal	Urban Outfitters	The vulva gallery
free people	Depop	Queer chocolatier

## Appendix P. Drug Database

## COMMONLY ABUSED DRUGS

WWW.DRUGABUSE.GOV/RESEARCHERS



PRINCIPLES OF EFFECTIVE TREATMENT		PRINCIPLES OF EFFECTIVE TREATMENT															
<div>1. Addiction is a complex but treatable disease that affects brain function and behavior.</div> <div>2. No single treatment is appropriate for everyone.</div> <div>3. Treatment needs to be readily available.</div> <div>4. Effective treatment attends to multiple needs of the individual, not just his or her drug use or misuse.</div> <div>5. Remaining in treatment for an adequate period of time is critical.</div> <div>6. Behavioral therapies—including individual, family, or group counseling—are the most commonly used forms of drug use disorder treatment.</div> <div>7. Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies.</div> <div>8. An individual's treatment and services plan must be assessed continually and modified as necessary to ensure that it meets his or her changing needs.</div> <div>9. Many drug-addicted individuals also have other mental disorders.</div> <div>10. Medically assisted detoxification is only the first stage of addiction treatment and by itself does little to change long-term drug use and misuse.</div> <div>11. Treatment does not need to be voluntary to be effective.</div> <div>12. Drug use during treatment must be monitored continuously, as lapses during treatment do occur.</div> <div>13. Treatment programs should test patients for the presence of HIV/AIDS, Hepatitis B and C, tuberculosis, and other infectious diseases, provide risk-reduction counseling, and link patients to treatment if necessary.</div> <div>The Drug Enforcement Administration (DEA) schedule indicates the drug's acceptable medical use and its potential for abuse or dependence. The most up-to-date scheduling information can be found on the DEA website.</div>		COCAINE		HEROIN		INHALANTS		LSD		MARIJUANA (CANNABIS)		MDMA (ECSTASY/MOLLY)					
		DESCRIPTION		A powerfully addictive stimulant drug made from the leaves of the coca plant native to South America.  For more information, see the Cocaine Research Report.		An opioid drug made from morphine, a natural substance extracted from the seed pod of the various opium poppy plant.  For more information, see the Heroin Research Report.		Solvents, aerosols, and gases found in household products such as spray paints, markers, glues, and cleaning fluids; also nitrites (e.g., amyl nitrite), which are prescription medications for chest pain.  For more information, see the Inhalants Research Report.		A hallucinogen manufactured from lysergic acid, which is found in ergot, a fungus that grows on rye and other grains. LSD is an abbreviation of the scientific name lysergic acid diethylamide.  For more information, see the Hallucinogens and Dissociative Drugs Research Report.		Marijuana is made from the hemp plant, Cannabis sativa. The main psychoactive (mind-altering) chemical in marijuana is delta-9-tetrahydrocannabinol, or THC.  For more information, see the Marijuana Research Report.		A synthetic, psychoactive drug that has similarities to both the stimulant amphetamine and the hallucinogen mescaline. MDMA is an abbreviation of the scientific name 3,4-methylenedioxymethamphetamine.  For more information, see the MDMA (Ecstasy) Abuse Research Report.			
		STREET NAMES		Blow, Bump, C, Candy, Charlie, Coke, Crack, Flake, Rock, Snow, Toot		Brown sugar, China White, Dope, H, Horse, Junk, Skag, Skunk, Smack, White Horse With OTC cold medicine and antihistamine: Cheese		Poppers, snappers, whippers, laughing gas		Acid, Blotter, Blue Heaven, Cubes, Microdot, Yellow Sunshine		Blunt, Bud, Dope, Ganja, Grass, Green, Herb, Joint, Mary Jane, Pot, Reefer, Sinsemilla, Skunk, Smoke, Tress, Weed		Adam, Clarity, Eve, Lover's Speed, Peace, Uppers			
		COMMERCIAL NAMES		Cocaine hydrochloride topical solution (anesthetic rarely used in medical procedures)		No commercial uses		Various		No commercial uses		Various brand names in states where the sale of marijuana is legal		No commercial uses			
		COMMON FORMS		White powder, whitish rock crystal		White or brownish powder, or black sticky substance known as "black tar heroin"		Paint thinners or removers, degreasers, dry-cleaning fluids, gasoline, lighter fluids, correction fluids, permanent markers, electronics cleaners and fence sprays; glue, spray paint, hair or deodorant sprays, fabric protector sprays, aerosol computer cleaning products, vegetable oil sprays, butane lighters, propane tanks, whipped cream aerosol containers, refrigerant gases, ether, chloroform, halothane, nitrous oxide		Tablet; capsule; clear liquid; small, decorated squares of absorbent paper that liquid has been added to		Greenish-gray mixture of dried, shredded leaves, stems, seeds, and/or flowers; resin (hashish) or sticky, black liquid (hash oil)		Colorful tablets with imprinted logos, capsules, powder, liquid			
		COMMON WAYS TAKEN		Snorted, smoked, injected		Injected, smoked, snorted		Inhaled through the nose or mouth		Swallowed, absorbed through mouth tissues (paper square)		Smoked, eaten (mixed in food or brewed as tea)		Swallowed, snorted			
		DEA SCHEDULE		II		I		Not scheduled		I		I		I			
		POSSIBLE HEALTH EFFECTS		SHORT-TERM		Narrowed blood vessels; enlarged pupils; increased body temperature; heart rate, and blood pressure; headache; abdominal pain and nausea; euphoria; increased energy, alertness; insomnia, restlessness; anxiety, erratic and violent behavior, panic attacks, paranoia, psychosis; heart rhythm problems, heart attack; stroke, seizure, coma.		Euphoria; dry mouth; itching; nausea; vomiting; analgesia; slowed breathing and heart rate.		Confusion; nausea; slurred speech; lack of coordination; euphoria; dizziness; drowsiness; disinhibition; lightheadedness; hallucinations/ delusions; headache; sudden sniffing death due to heart failure from butane, propane, and other chemicals in aerosols; death from asphyxiation, suffocation, convulsions or seizures, coma, or choking.  Nitrites: enlarged blood vessels, enhanced sexual pleasure, increased heart rate, brief sensation of heat and excitement, dizziness, headache.		Rapid emotional swings; distortion of a person's ability to recognize reality, think rationally, or communicate with others; raised blood pressure, heart rate, body temperature; dizziness; loss of appetite; tremors; enlarged pupils.		Enhanced sensory perception and euphoria followed by drowsiness/relaxation; slowed reaction time; problems with balance and coordination; increased heart rate and appetite; problems with learning and memory; anxiety.		Lowered inhibition; enhanced sensory perception; increased heart rate and blood pressure; muscle tension; nausea; faintness; chills or sweating; sharp rise in body temperature leading to kidney failure or death.	
				LONG-TERM		Loss of sense of smell, nosebleeds, nasal damage and trouble swallowing from snorting; infection and death of bowel tissue from decreased blood flow; poor nutrition and weight loss; lung damage from smoking.		Collapsed veins; abscesses (swollen tissue with pus); infection of the lining and valves in the heart; constipation and stomach cramps; liver or kidney disease.		Liver and kidney damage; bone marrow damage; limb spasms due to nerve damage; brain damage from lack of oxygen that can cause problems with thinking, movement, vision, and hearing.  Nitrites: increased risk of pneumonia.		Frightening flashbacks (called Hallucinogen Persisting Perception Disorder [HPPD]); ongoing visual disturbances; disorganized thinking, paranoia, and mood swings.		Mental health problems, chronic cough, frequent respiratory infections. In rare cases, risk of recurrent episodes of severe nausea and vomiting.		Long-lasting confusion, depression, problems with attention, memory, and sleep; increased anxiety, impulsiveness less interest in sex.	
				OTHER HEALTH-RELATED ISSUES		Pregnancy: premature delivery, low birth weight, deficits in self-regulation and attention in school-aged children prenatally exposed. Risk of HIV, hepatitis, and other infectious diseases from shared needles.		Pregnancy: miscarriage, low birth weight, neonatal abstinence syndrome. Risk of HIV, hepatitis, and other infectious diseases from shared needles.		Pregnancy: low birth weight, bone problems, delayed behavioral development due to brain problems, altered metabolism and body composition.		Unknown		Youth: May impair brain development and learning functions. Pregnancy: babies born with problems with attention, memory, and problem solving.		Unknown	
IN COMBINATION WITH ALCOHOL				Greater risk of cardiac toxicity than from either drug alone.		Dangerous slowdown of heart rate and breathing, coma, death.		Unknown		Unknown		Increased heart rate, blood pressure; further slowing of mental processing and reaction time.		MDMA decreases some of alcohol's effects. Alcohol can increase plasma concentrations of MDMA, which may increase the risk of neurotoxic effects.			
TREATMENT OPTIONS		WITHDRAWAL SYMPTOMS		Depression, tiredness, increased appetite, insomnia, vivid unpleasant dreams, slowed movement, restlessness.		Restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps ("cold turkey").		Nausea, tremors, irritability, problems sleeping, and mood changes.		Unknown		Irritability, trouble sleeping, decreased appetite, anxiety.		Fatigue, loss of appetite, depression, aggression, trouble concentrating.			
		MEDICATIONS		There are no FDA-approved medications to treat cocaine addiction.		Methadone Buprenorphine Naltrexone (short- and long-acting forms)		There are no FDA-approved medications to treat inhalant addiction.		There are no FDA-approved medications to treat addiction to LSD or other hallucinogens.		There are no FDA-approved medications to treat marijuana addiction.		There is conflicting evidence about whether MDMA is addictive. There are no FDA-approved medications to treat MDMA addiction.			
		BEHAVIORAL THERAPIES		<ul style="list-style-type: none"><li>Cognitive-behavioral therapy (CBT)</li><li>Contingency management, or motivational incentives, including vouchers</li><li>The Matrix model</li><li>Community-based recovery groups, such as 12-step programs</li><li>Mobile medical application: reSET*</li></ul>		<ul style="list-style-type: none"><li>Contingency management, or motivational incentives</li><li>12-Step facilitation therapy</li></ul>		More research is needed to find out if behavioral therapies can be used to treat inhalant addiction.		More research is needed to find out if behavioral therapies can be used to treat addiction to hallucinogens.		<ul style="list-style-type: none"><li>Cognitive-behavioral therapy (CBT)</li><li>Contingency management, or motivational incentives</li><li>Motivational Enhancement Therapy (MET)</li><li>Behavioral treatments geared to adolescents</li><li>Mobile medical application: reSET*</li></ul>		More research is needed to find out if behavioral therapies can be used to treat MDMA addiction.			

## COMMONLY ABUSED DRUGS

WWW.DRUGABUSE.GOV/RESEARCHERS



	METHAMPHETAMINE	PCP	SYNTHETIC CANNABINOIDS	SYNTHETIC CATHINONES ("BATH SALTS")	TOBACCO	ALCOHOL
<b>DESCRIPTION</b>	An extremely addictive stimulant amphetamine drug. For more information, see the <i>Methamphetamine Research Report</i> .	A dissociative drug developed as an intravenous anesthetic that has been discontinued due to serious adverse effects. Dissociative drugs are hallucinogens that cause the user to feel detached from reality. PCP is an abbreviation of the scientific name, phencyclidine. For more information, see the <i>Hallucinogens and Dissociative Drugs Research Report</i> .	A wide variety of herbal mixtures containing man-made cannabinoid chemicals related to THC in marijuana but often much stronger and more dangerous. Sometimes misleadingly called "synthetic marijuana" and marketed as a "natural," "safe," legal alternative to marijuana. For more information, see the <i>Synthetic Cannabinoids DrugFacts</i> .	An emerging family of drugs containing one or more synthetic chemicals related to cathinone, a stimulant found naturally in the khat plant. Examples of such chemicals include methylenedioxymethamphetamine (MDMA) and 3,4-methylenedioxypyrovalerone (MDPV). For more information, see the <i>Synthetic Cathinones ("Bath Salts") DrugFacts</i> .	Plant grown for its leaves, which are dried and fermented before use. For more information, see the <i>Tobacco/Nicotine Research Report</i> .	Ethyl alcohol, or ethanol, is an intoxicating ingredient found in beer, wine and liquor. It is produced by the fermentation of yeast, sugar, and starches.
<b>STREET NAMES</b>	Crack, Chalk, Crystal, Fire, Glass, Go Fast, Ice, Meth, Speed	Angel Dust, Boat, Hog, Low Boat, Peace Pill	K2, Spice, Black Mamba, Bliss, Bombay Blue, Fake Weed, Fire, Genie, Moon Rocks, Skunk, Smacked, Yucatan, Zohal	Bloom, Cloud Nine, Cosmic Blast, Flakka, Ivory Wave, Lunar Wave, Scarlett, Vanilla Sky, White Lightning	None	Booze, Juice, Sauce, Brew
<b>COMMERCIAL NAMES</b>	Desoxyn®	No commercial uses	No commercial uses	No commercial uses for ingested "bath salts"	Multiple brand names	Various
<b>COMMON FORMS</b>	White powder or pill; crystal meth looks like pieces of glass or shiny blue-white "rocks" of different sizes	White or colored powder, tablet, or capsule; clear liquid	Dried, shredded plant material that looks like potpourri and is sometimes sold as "incense"	White or brown crystalline powder sold in small plastic or foil packages labeled "not for human consumption" and sometimes sold as jewelry cleaner; tablet, capsule, liquid	Cigarettes, cigars, bids, hookahs, smokeless tobacco (snuff, spit tobacco, chew)	Beer, wine, liquor/spirits/malt beverages
<b>COMMON WAYS TAKEN</b>	Swallowed, snorted, smoked, injected	Injected, snorted, swallowed, smoked (powder added to mint, parsley, oregano, or marijuana)	Smoked, swallowed (brewed as tea)	Swallowed, snorted, injected	Smoked, snorted, chewed, vaporized	Ingested by drinking
<b>DEA SCHEDULE</b>	II	I, II	I	I (Some formulations have been banned by the DEA)	Not Scheduled	Not scheduled; (legal for purchase or use by those under age 21)
<b>POSSIBLE HEALTH EFFECTS</b>	<b>SHORT-TERM</b>	Increased wakefulness and physical activity; decreased appetite; increased breathing; heart rate, blood pressure, temperature; irregular heartbeat	Delusions, hallucinations, paranoia, problems thinking, a sense of distance from one's environment, anxiety. Low doses: slight increase in breathing rate; increased blood pressure and heart rate; shallow breathing; face redness and sweating; numbness of the hands or feet; problems with movement. High doses: nausea; vomiting; flicking up and down of the eyes; drooling; loss of balance; dizziness; violence; seizures; coma, and death.	Increased heart rate; vomiting; agitation; confusion; hallucinations, anxiety, paranoia; increased blood pressure.	Increased heart rate and blood pressure; euphoria; increased sociability and sex drive; paranoia, agitation, and hallucinations; violent behavior; sweating; nausea, vomiting; insomnia; irritability; dizziness; depression; panic attacks; reduced motor control; cloudy thinking.	Increased blood pressure, breathing, and heart rate.
	<b>LONG-TERM</b>	Anxiety, confusion, insomnia, mood problems, violent behavior, paranoia, hallucinations, delusions, weight loss, severe dental problems ("meth mouth"), intense itching leading to skin sores from scratching.	Memory loss, problems with speech and thinking, loss of appetite, anxiety.	Unknown	Death	Greatly increased risk of cancer, especially lung cancer when smoked and oral cancers when chewed; chronic bronchitis; emphysema; heart disease; leukemia; cataracts; pneumonia.
	<b>OTHER HEALTH-RELATED ISSUES</b>	Pregnancy: premature delivery; separation of the placenta from the uterus; low birth weight; lethargy; heart and brain problems. Risk of HIV, hepatitis, and other infectious diseases from shared needles.	PCP has been linked to self-injury. Risk of HIV, hepatitis, and other infectious diseases from shared needles.	Use of synthetic cannabinoids has led to an increase in emergency room visits in certain areas.	Risk of HIV, hepatitis, and other infectious diseases from shared needles.	Pregnancy: miscarriage, low birth weight, stillbirth, learning and behavior problems.
	<b>IN COMBINATION WITH ALCOHOL</b>	Masks the depressant effect of alcohol, increasing risk of alcohol overdose; may increase blood pressure.	Unknown	Unknown	Unknown	Unknown
	<b>WITHDRAWAL SYMPTOMS</b>	Depression, anxiety, tiredness.	Headaches, increased appetite, sleepiness, depression.	Headaches, anxiety, depression, irritability.	Depression, anxiety.	Irritability, attention and sleep problems, depression, increased appetite.
<b>TREATMENT OPTIONS</b>	<b>MEDICATIONS</b>	There are no FDA-approved medications to treat methamphetamine addiction.	There are no FDA-approved medications to treat addiction to PCP or other dissociative drugs.	There are no FDA-approved medications to treat synthetic cannabinoid addiction.	There are no FDA-approved medications to treat addiction to synthetic cathinones.	Bupropion (Zyban®) Varenicline (Chantrel®) Nicotine replacement (gum, patch, lozenge)
	<b>BEHAVIORAL THERAPIES</b>	<ul style="list-style-type: none"> <li>Cognitive-behavioral therapy (CBT)</li> <li>Contingency management, or motivational incentives</li> <li>The Matrix model</li> <li>12-Step facilitation therapy</li> <li>Mobile medical application: reSET®</li> </ul>	More research is needed to find out if behavioral therapies can be used to treat addiction to dissociative drugs.	More research is needed to find out if behavioral therapies can be used to treat synthetic cannabinoid addiction.	<ul style="list-style-type: none"> <li>Cognitive-behavioral therapy (CBT)</li> <li>Contingency management, or motivational incentives</li> <li>Motivational Enhancement Therapy (MET)</li> <li>Behavioral treatments geared to teens</li> </ul>	<ul style="list-style-type: none"> <li>Cognitive-behavioral therapy (CBT)</li> <li>Self-help materials</li> <li>Mail, phone, and internet quit resources</li> </ul>

## Additional Resources:

- Substance Abuse and Mental Health Services Administration (SAMHSA) Treatment Locator: <http://www.findtreatment.samhsa.gov>; 1-800-662-HELP.
- The "Find a Physician" feature on the American Society of Addiction Medicine (ASAM) website: <http://www.asam.org/for-the-public-treatment>.
- The Patient Referral Program on the American Academy of Addiction Psychiatry website: <http://www.aap.org/patient-resources>.
- The Child and Adolescent Psychiatrist Finder on the American Academy of Child & Adolescent Psychiatry Web site: [http://http://www.aacap.org/aacap/Families\\_and\\_Youth/Resources/CAP\\_Finder.aspx](http://http://www.aacap.org/aacap/Families_and_Youth/Resources/CAP_Finder.aspx).
- The Surgeon General's Report on Alcohol, Drugs, and Health: <https://addiction.surgeongeneral.gov/>
- For clinical trials information, go to [www.clinicaltrials.gov](http://www.clinicaltrials.gov).

## For More Information:

The NIDA website, [www.drugabuse.gov](http://www.drugabuse.gov), has information on a variety of drugs and related information.

Some publications, including these charts, are available in print, free of charge.

To order print copies, call the DRUGabuse Research Dissemination Center at 1-877-NIH-NIDA or go to [drugsabuse.gov](http://drugsabuse.gov).

## COMMONLY ABUSED DRUGS: PRESCRIPTIONS AND OTCS

WWW.DRUGABUSE.GOV/RESEARCHERS



PRESCRIPTION																
COMMERCIAL NAMES (COMMON)	CENTRAL NERVOUS SYSTEM DEPRESSANTS			OPIOIDS								STIMULANTS		ANABOLIC STEROIDS		
	Barbiturates: pentobarbital (Nembutal®)	Benzodiazepines: alprazolam (Xanax®), chlorazepate (Klonopin®), diazepam (Valium®), lorazepam (Ativan®), triazolam (Halcion®)	Sleep Medications: eszopiclone (Lunesta®), zaleplon (Sonata®), zolpidem (Ambien®)	Codine (various brand names)	Fentanyl (Actiq®, Duragesic®, Sublimaze®)	Hydrocodone or dihydrocodeine (Vicodin®, Norco®, Zohydro®, and others)	Hydromorphone (Dilaudid®)	Meperidine (Demerol®)	Methadone (Dolophine®, Methadose®)	Morphine (Duramorph®, Ms Contin®)	Oxycodone (OxyContin®, Percodan®, Percocet®, and others)	Oxymorphone (Opana®)	Amphetamine (Adderall®)	Methylphenidate (Concerta®, Ritalin®)	Nandrolone (DecaDuo®), oxandrolone (Anadrol®), oxymetholone (Anadrol-50®), testosterone cypionate (Depo-testosterone®)	
DESCRIPTION	Medications that slow brain activity, which makes them useful for treating anxiety and sleep problems. For more information, see the <i>Misuse of Prescription Drugs Research Report</i> .			Pain relievers with an origin similar to that of heroin. Opioids can cause euphoria and are often used nonmedically, leading to overdose deaths. For more information, see the <i>Misuse of Prescription Drugs Research Report</i> .								Medications that increase alertness, attention, energy, blood pressure, heart rate, and breathing rate. For more information, see the <i>Misuse of Prescription Drugs Research Report</i> .		Man-made substances used to treat conditions caused by low levels of steroid hormones in the body and abused to enhance athletic and sexual performance and physical appearance. For more information, see the <i>Anabolic Steroid Abuse Research Report</i> .		
STREET NAMES	Barbs, Phenies, Red Birds, Reds, Toies, Yellow Jackets, Yellow	Candy, Downers, Sleeping Pills, Tranks	Forget-me Pill, Mexican Valium, R2, Roche, Roofies, Roofies, Ropes, Rophies	Captain Cody, Cody, Leon, Schoolboy, Sizzur, Purple Drank With glutathione: Doors & Fours, Loads, Pancakes and Syrup	Apache, China Girl, China White, Dance Fever, Friend, Goodfella, Jackpot, Murder & Tango and Cash, TNT	Vike, Watson-367	O, Dillies, Footballs, Juice, Smack	Dermies, Pain Killer	Amidone, Fizzies with MDMA: Chocolate Chip Cookies	M, Miss Emma, Monkey, White Stuff	O.C., Oxycof, Oxycontin, Oxy, Villyally Heroin, Percs	Biscuits, Blue Heaven, Blue, Mrs. O, O Bomb, Octagons, Stop Signs	Bennies, Black Beauties, Crosses, Hearts, LA, Turnaround, Speed, Truck Drivers, Uppers	Jif, MPH, R-ball, Skippy, The Smart Drug, Vitamin R	Juice, Gym Candy, Pumpers, Roids	
COMMON FORMS	Pill, capsule, liquid	Pill, capsule, liquid	Pill, capsule, liquid	Tablet, capsule, liquid	Lozenge, sublingual tablet, film, buccal tablet	Capsule, liquid, tablet	Liquid, suppository	Tablet, liquid	Tablet, dispersible tablet, liquid	Tablet, liquid, capsule, suppository	Capsule, liquid, tablet	Tablet	Tablet, capsule	Liquid, tablet, chewable tablet, capsule	Tablet, capsule, liquid drops, gel, cream, patch, injectable solution	
COMMON WAYS TAKEN	Swallowed, injected	Swallowed, snorted	Swallowed, snorted	Injected, swallowed (often mixed with soda and flavorings)	Injected, smoked, snorted	Swallowed, snorted, injected	Injected, rectal	Swallowed, snorted, injected	Swallowed, injected	Injected, swallowed, smoked	Swallowed, snorted, injected	Swallowed, snorted, injected	Swallowed, snorted, smoked, injected	Swallowed, snorted, smoked, injected	Injected, swallowed, applied to skin	
DEA SCHEDULE	II, III, IV	IV	IV	II, III, V	II	II	II	II	II	II, III	II	II	II	II	III	
POSSIBLE HEALTH EFFECTS	SHORT-TERM	Drowsiness, slurred speech, poor concentration, confusion, dizziness, problems with movement and memory, lowered blood pressure, slowed breathing.			Pain relief, drowsiness, nausea, constipation, euphoria, slowed breathing, death.								Increased alertness, attention, energy; increased blood pressure and heart rate; narrowed blood vessels; increased blood sugar; opened-up breathing passages.  High doses: dangerously high body temperature and irregular heartbeat; heart disease; seizures.		Builds muscles, improved athletic performance. Acne, fluid retention (especially in the hands and feet), oily skin, yellowing of the skin, infection.	
	LONG-TERM	Unknown			Increased risk of overdose or abuse if misused.								Heart problems, psychosis, anger, paranoia.		Kidney damage or failure; liver damage; high blood pressure, enlarged heart, or changes in cholesterol leading to increased risk of stroke or heart attack, even in young people; aggression; extreme mood swings; anger ("roid rage"); extreme irritability; delusions; impaired judgment.	
	OTHER HEALTH-RELATED ISSUES	Sleep medications are sometimes used as date rape drugs. Risk of HIV, hepatitis, and other infectious diseases from shared needles.			Pregnancy: Miscarriage, low birth weight, neonatal abstinence syndrome. Older adults: higher risk of accidental misuse or abuse because many older adults have multiple prescriptions, increasing the risk of drug-drug interactions, and breakdown of drugs slows with age; also, many older adults are treated with prescription medications for pain. Risk of HIV, hepatitis, and other infectious diseases from shared needles.								Risk of HIV, hepatitis, and other infectious diseases from shared needles.		Males: shrunken testicles, lowered sperm count, infertility, baldness, development of breasts. Females: facial hair, male-pattern baldness, enlargement of the clitoris, deepened voice. Adolescents: stunted growth. Risk of HIV, hepatitis, and other infectious diseases from shared needles.	
	IN COMBINATION WITH ALCOHOL	Further slows heart rate and breathing, which can lead to death.			Dangerous slowing of heart rate and breathing leading to coma or death.								Masks the depressant action of alcohol, increasing risk of alcohol overdose; may increase blood pressure.		Increased risk of violent behavior.	
TREATMENT OPTIONS	WITHDRAWAL SYMPTOMS	Must be discussed with a health care provider; barbiturate withdrawal can cause a serious abstinence syndrome that may even include seizures.			Restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps ("cold turkey"), leg movements.								Depression, tiredness, sleep problems.		Mood swings; tiredness; restlessness; loss of appetite; insomnia; lowered sex drive; depression, sometimes leading to suicide attempts.	
	MEDICATIONS	There are no FDA-approved medications to treat addiction to prescription sedatives; lowering the dose over time must be done with the help of a health care provider.			<ul style="list-style-type: none"><li>• Methadone</li><li>• Buprenorphine</li><li>• Naltrexone (short- and long-acting)</li></ul>								There are no FDA-approved medications to treat stimulant addiction.		Hormone therapy	
	BEHAVIORAL THERAPIES	More research is needed to find out if behavioral therapies can be used to treat addiction to prescription sedatives.			The same behavioral therapies that have helped treat addiction to heroin are used to treat prescription opioid addiction.								<ul style="list-style-type: none"><li>• Behavioral therapies that have helped treat addiction to cocaine or methamphetamine may be useful in treating prescription stimulant addiction.</li><li>• Mobile medical application: reSET®</li></ul>		More research is needed to find out if behavioral therapies can be used to treat steroid addiction.	



## COMMONLY ABUSED DRUGS: PRESCRIPTIONS AND OTCs

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## PRINCIPLES OF EFFECTIVE TREATMENT

- Addiction is a complex but treatable disease that affects brain function and behavior.
- No single treatment is appropriate for everyone.
- Treatment needs to be readily available.
- Effective treatment attends to multiple needs of the individual, not just his or her drug use or misuse.
- Remaining in treatment for an adequate period of time is critical.
- Behavioral therapies—including individual, family, or group counseling—are the most commonly used forms of drug use disorder treatment.
- Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies.
- An individual's treatment and services plan must be assessed continually and modified as necessary to ensure that it meets his or her changing needs.
- Many drug-addicted individuals also have other mental disorders.
- Medically assisted detoxification is only the first stage of addiction treatment and by itself does little to change long-term drug use and misuse.
- Treatment does not need to be voluntary to be effective.
- Drug use during treatment must be monitored continuously, as lapses during treatment do occur.
- Treatment programs should test patients for the presence of HIV/AIDS, Hepatitis B and C, tuberculosis, and other infectious diseases, provide risk-reduction counseling, and link patients to treatment if necessary.

*The Drug Enforcement Administration (DEA) schedule indicates the drug's acceptable medical use and its potential for abuse or dependence. The most up-to-date scheduling information can be found on the DEA website.*

OVER-THE-COUNTER		
	DEXTROMETHORPHAN	LOPERAMIDE
COMMERCIAL NAMES (COMMON)	Various (many brand names include "DM")	Imodium
DESCRIPTION	Psychoactive when taken in higher-than-recommended amounts. For more information, see Over-the-Counter Medicines.	An anti-diarrheal that can cause euphoria when taken in higher-than-recommended doses.
STREET NAMES	Robo, Robo, Triple C	None
COMMON FORMS	Syrup, capsule	Tablet, capsule, or liquid
COMMON WAYS TAKEN	Swallowed	Swallowed
DEA SCHEDULE	Not scheduled	Not scheduled
POSSIBLE HEALTH EFFECTS	SHORT-TERM	Cough relief, euphoria, slurred speech; increased heart rate and blood pressure; dizziness, nausea, vomiting.
	LONG-TERM	Unknown
	OTHER HEALTH-RELATED ISSUES	Breathing problems, seizures, and increased heart rate may occur from other ingredients in cough/cold medicines.
	IN COMBINATION WITH ALCOHOL	Unknown
	WITHDRAWAL SYMPTOMS	Unknown
TREATMENT OPTIONS	MEDICATIONS	There are no FDA-approved medications to treat addiction to dextromethorphan.
	BEHAVIORAL THERAPIES	More research is needed to find out if behavioral therapies can be used to treat addiction to dextromethorphan.

## NIDA Resources:



**NIDAMED** – Tools and resources to increase awareness of the impact of substance use on patients' overall health and to help clinicians and those in training identify patient drug use early and prevent it from escalating to abuse or addiction. Learn more at [www.drugabuse.gov/nidamed](http://www.drugabuse.gov/nidamed).



**Preventing Drug Use among Children and Adolescents: A Research-Based Guide for Parents, Educators, and Community Leaders** – NIDA's research-based guide for preventing drug abuse among children and adolescents provides 16 principles derived from effective drug-prevention research and includes answers to questions on risk and protective factors as well as on community planning and implementation.



**Principles of Drug Addiction Treatment: A Research-Based Guide** – This guide summarizes the 13 principles of effective treatment, answers common questions, and describes types of treatment, providing examples of scientifically-based and tested treatment components.



**Principles of Adolescent Substance Use Disorder Treatment: A Research-Based Guide** – This guide discusses the urgency of treating addictions and other substance use disorders in teenagers, answers common questions about how young people are treated for drug problems, and describes effective treatment approaches supported by scientific evidence.



**Principles of Drug Abuse Treatment for Criminal Justice Populations: A Research-Based Guide** – NIDA's research-based guide for treating people with addiction who are involved with the criminal justice system provides 13 essential treatment principles and includes answers to frequently asked questions and resource information.

## Additional Resources:

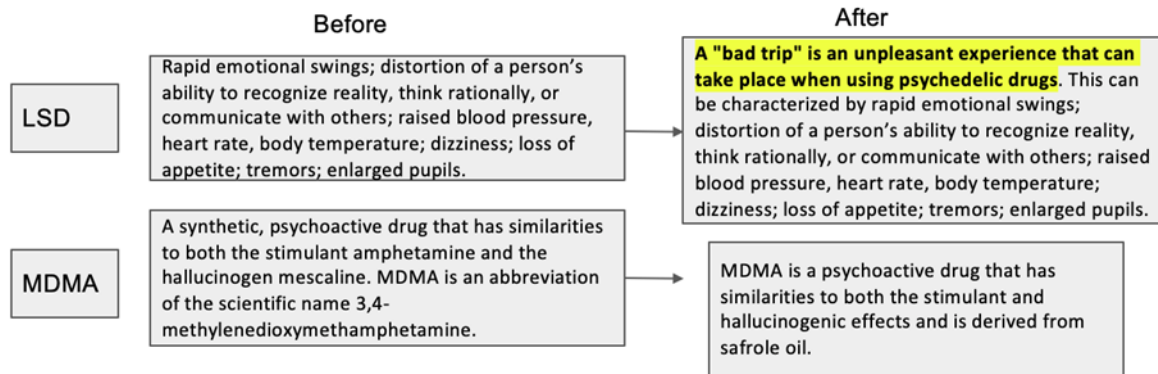
- Substance Abuse and Mental Health Services Administration (SAMHSA) Treatment Locator: <http://www.findtreatment.samhsa.gov>; 1-800-662-HELP.
- The "Find a Physician" feature on the American Society of Addiction Medicine (ASAM) website: <http://www.asam.org/for-the-public-treatment>.
- The Patient Referral Program on the American Academy of Addiction Psychiatry website: <http://www.aap.org/patient-resources>.
- The Child and Adolescent Psychiatrist Finder on the American Academy of Child & Adolescent Psychiatry Web site: [http://http://www.aacap.org/aacap/Families\\_and\\_Youth/Resources/CAP\\_Finder.aspx](http://http://www.aacap.org/aacap/Families_and_Youth/Resources/CAP_Finder.aspx).
- The Surgeon General's Report on Alcohol, Drugs, and Health: <https://addiction.surgeongeneral.gov/>
- For clinical trials information, go to [www.clinicaltrials.gov](http://www.clinicaltrials.gov).

## For More Information:

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## Appendix Q. Example of Harm Reduction Principal Application

### Harm Reduction Approach - The Unbiased Drug Information Database



## Appendix R. Body Scan Script for the Mindfulness Section



### A BODY SCAN SCRIPT

Begin by making yourself comfortable. Sit in a chair and allow your back to be straight, but not stiff, with your feet on the ground. You could also do this practice standing or if you prefer, you can lie down and have your head supported. Your hands could be resting gently in your lap or at your side. Allow your eyes to close, or to remain open with a soft gaze.

Take several long, slow, deep breaths. Breathing in fully and exhaling slowly. Breathe in through your nose and out through your nose or mouth. Feel your stomach expand on an inhale and relax and let go as you exhale.

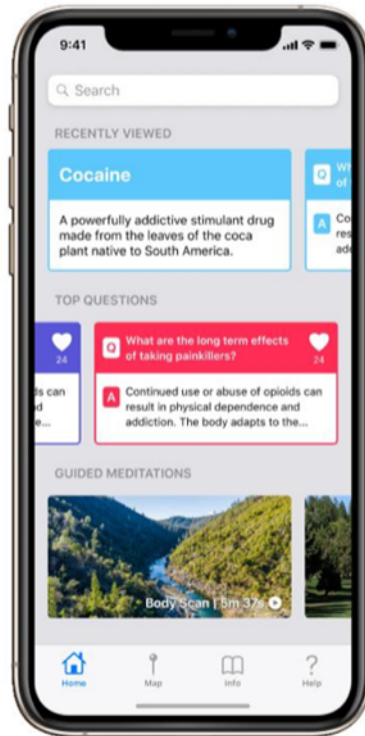
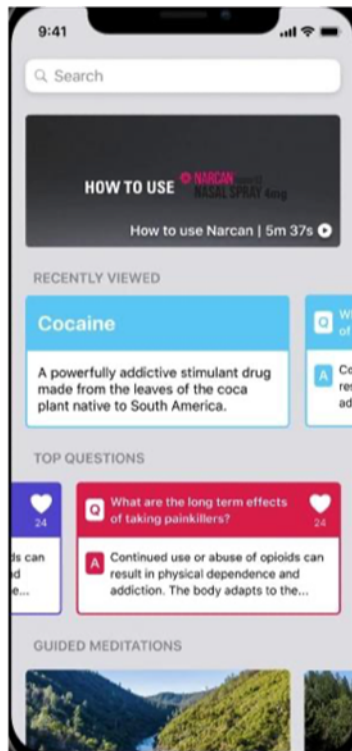
Begin to let go of noises around you. Begin to shift your attention from outside to inside yourself. If you are distracted by sounds in the room, simply notice this and bring your focus back to your breathing.

Now slowly bring your attention down to your feet. Begin observing sensations in your feet. You might want to wiggle your toes a little, feeling your toes against your socks or shoes. Just notice, without judgment. You might imagine sending your breath down to your feet, as if the breath is traveling through the nose to the lungs and through the abdomen all the way down to your feet. And then back up again out through your nose and lungs. Perhaps you don't feel anything at all. That is fine, too. Just allow yourself to feel the sensation of not feeling anything.

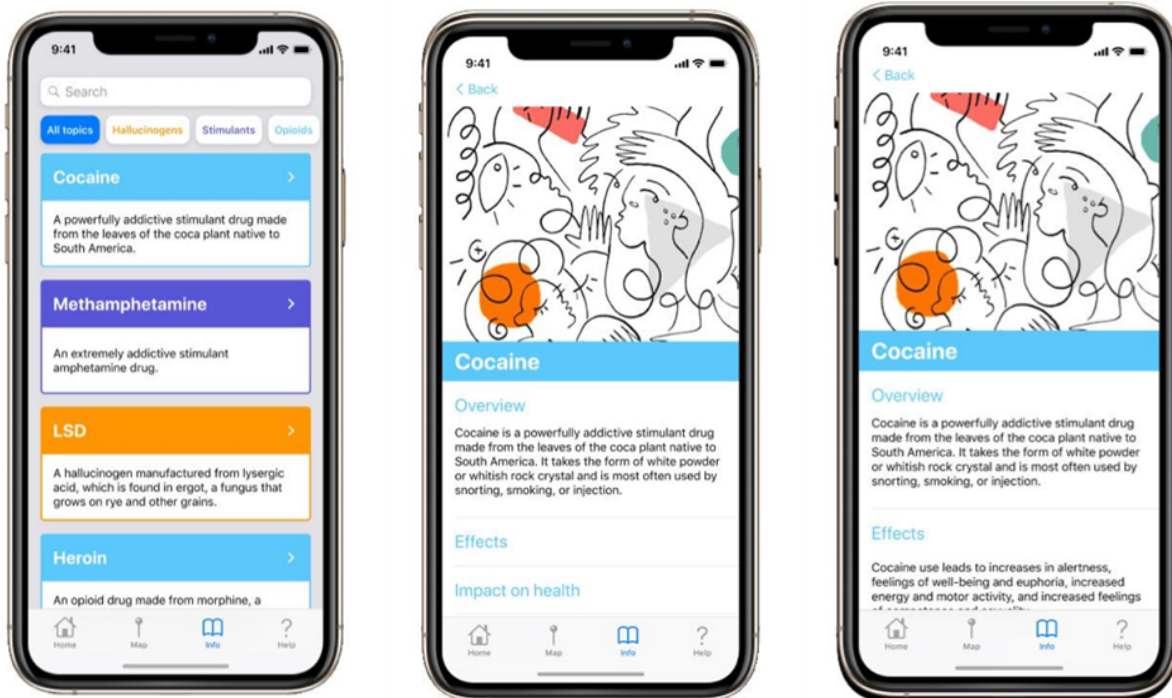
When you are ready, allow your feet to dissolve in your mind's eye and move your attention up to your ankles, calves, knees and thighs. Observe the sensations you are experiencing throughout your legs. Breathe into and breathe out of the legs. If your mind begins to wander during this exercise, gently notice this without judgment and bring your mind back to noticing the sensations in your legs. If you notice any discomfort, pain or stiffness, don't judge this. Just simply notice it. Observe how all sensations rise and fall, shift and change moment to moment. Notice how no sensation is permanent. Just observe and allow the sensations to be in the moment, just as they are. Breathe into and out from the legs.

Then on the next out breath, allow the legs to dissolve in your mind. And move to the sensations in your lower back and pelvis. Softening and releasing as you breathe in and out. Slowly move your attention up to your mid back and upper back. Become curious about the sensations here. You may become aware of sensations in the muscle, temperature or points of contact with furniture or the bed. With each outbreath, you may let go of tension you are carrying. And then very gently shift your focus to your stomach and all the internal organs here. Perhaps you notice the feeling of clothing, the process of digestion or the belly rising or falling with each breath. If you notice opinions arising about these areas, gently let these go and return to noticing sensations. As you continue to breathe, bring your awareness to the chest and heart region and just notice your heartbeat. Observe how the chest rises during the inhale and how the chest falls during the exhale. Let go of any judgments that may arise. On the next outbreath, shift the focus to your hands and fingertips. See if you can channel your breathing into and out of this area as if you are breathing into and out from your hands. If your mind wanders, gently bring it back to the sensations in your hands.

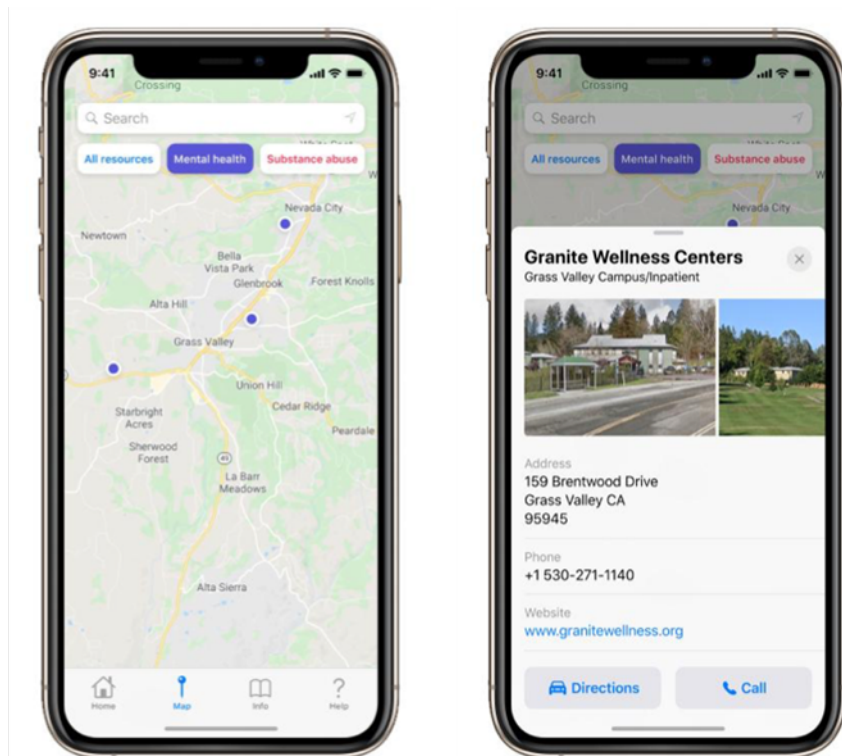


**Appendix S. GWConnect Home Section**

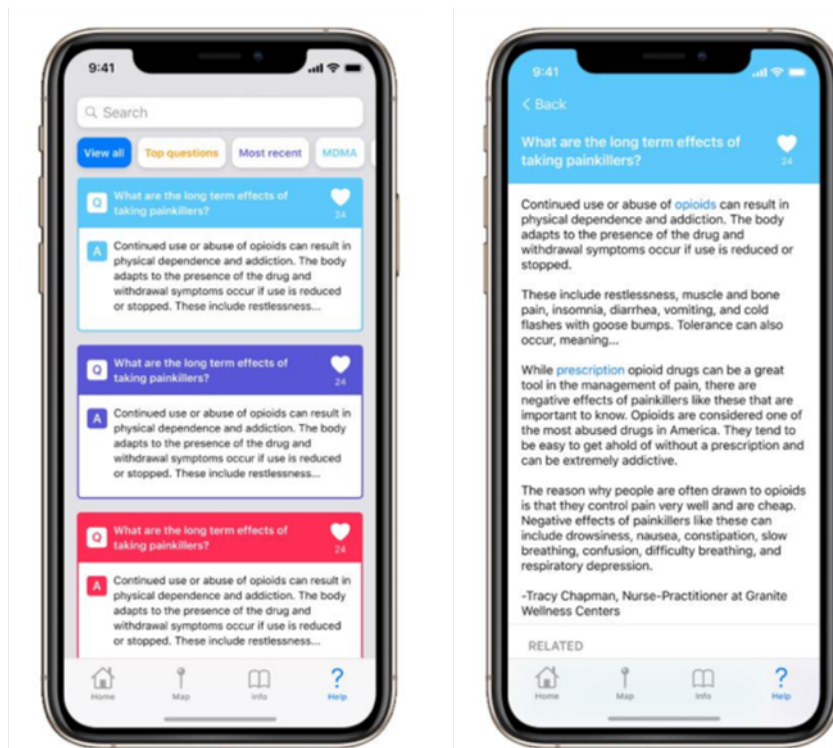
## Appendix T. GWConnect Drug Info Section



## Appendix U. GWConnect Map Section

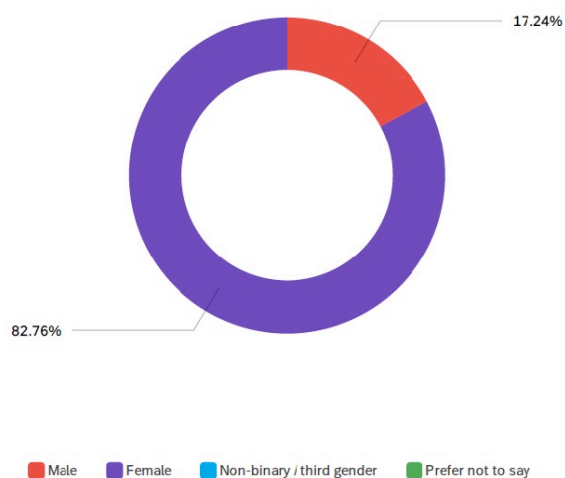


## Appendix V. GWConnect Help Section

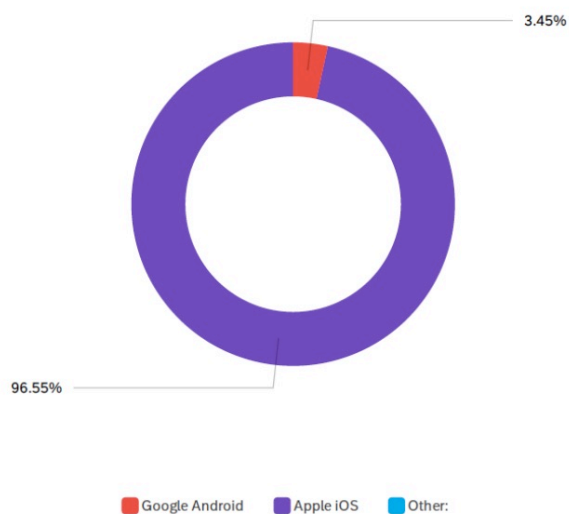


## Appendix W. Pre-Pilot Survey Findings

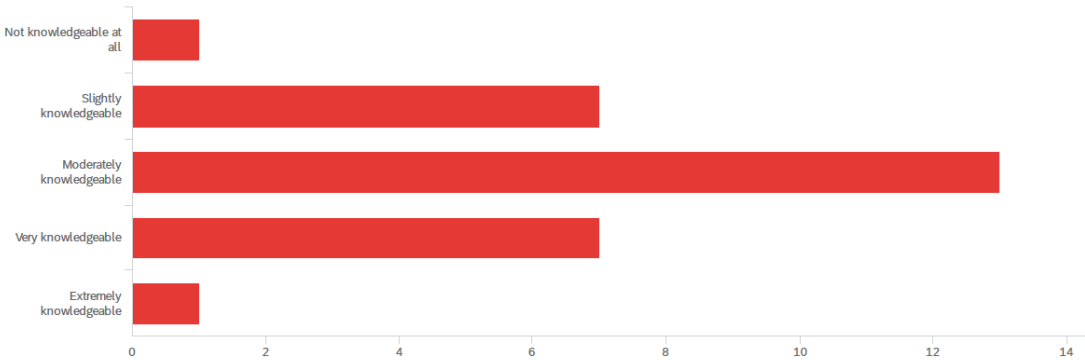
Q4 - What is your gender?



Q1 - Does your smartphone have a Google Android or an Apple iOS operating system?



Q5 - How knowledgeable do you feel about drugs?

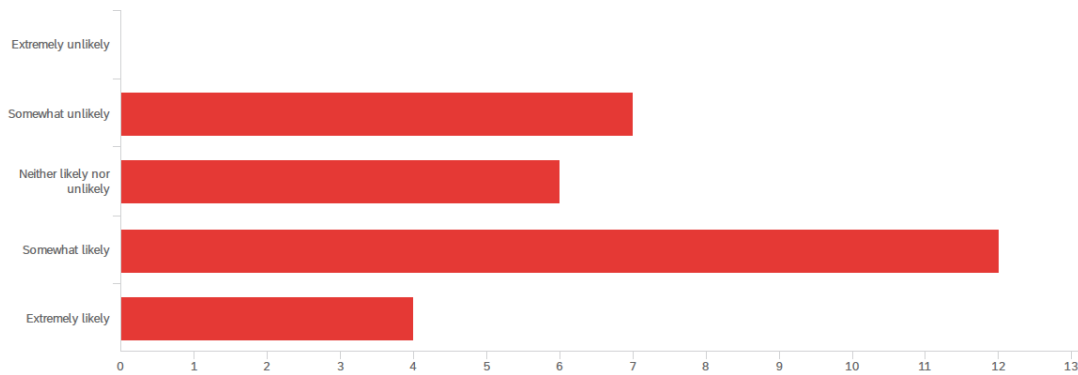


#	Field	Choice Count
1	Not knowledgeable at all	3.45% 1
2	Slightly knowledgeable	24.14% 7
3	Moderately knowledgeable	44.83% 13
4	Very knowledgeable	24.14% 7
5	Extremely knowledgeable	3.45% 1
		29

Showing rows 1 - 6 of 6

#	1
Field	How knowledgeable do you feel about drugs?
Mean	3.00
Std Deviation	0.87
Variance	0.76
Count	29

## Q6 - How likely are you to use a mobile app to access information on drugs?

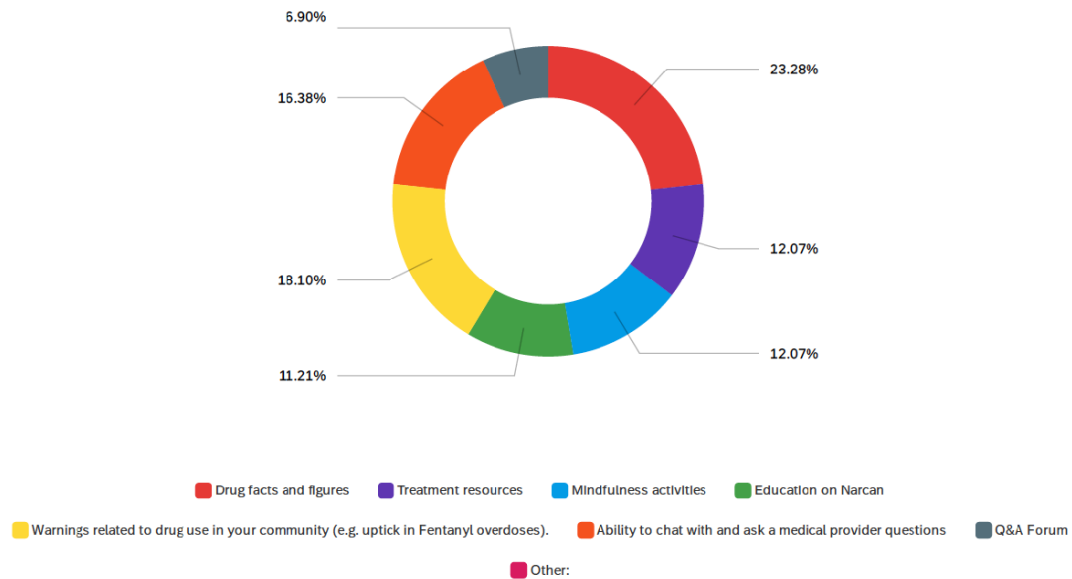


#	Field	Choice Count
1	Extremely unlikely	0.00% 0
2	Somewhat unlikely	24.14% 7
3	Neither likely nor unlikely	20.69% 6
4	Somewhat likely	41.38% 12
5	Extremely likely	13.79% 4
		29

Showing rows 1 - 6 of 6

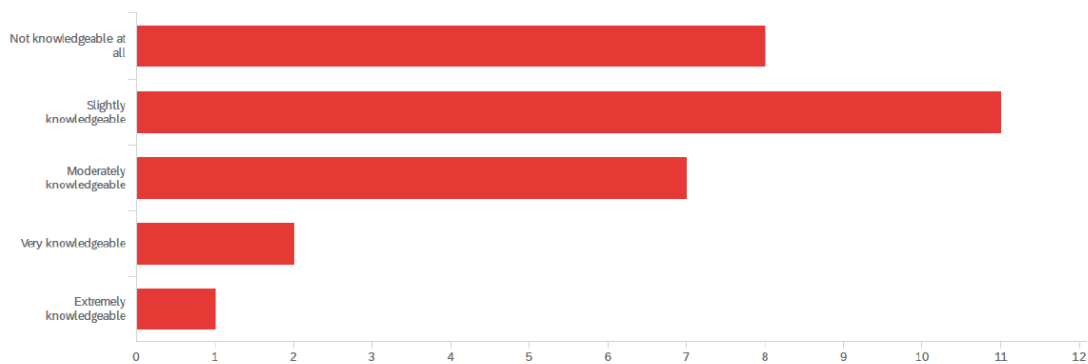
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How likely are you to use a mobile app to access information on drugs?	2.00	5.00	3.45	1.00	1.01	29

Q12 - What features are important to include in a mobile app containing information on drugs and related resources?





Q13 - If you or someone you know needed help for drug use/misuse, how knowledgeable are you regarding where resources are in your local area and how to access them?



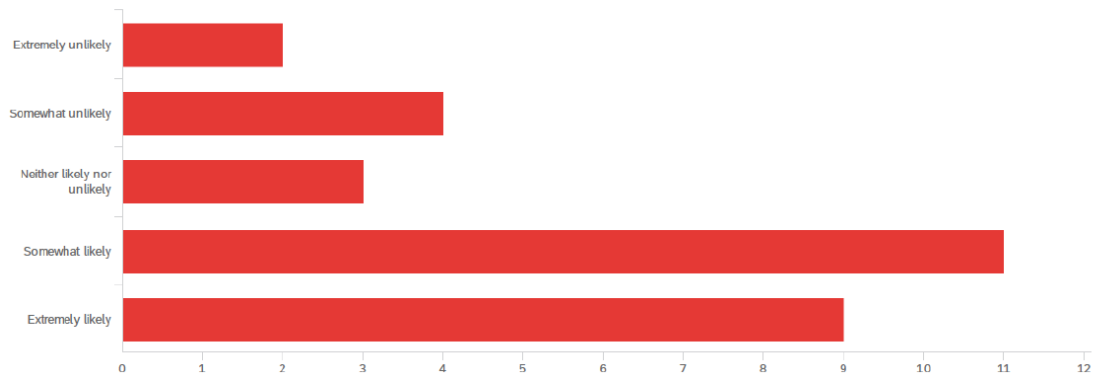
#	Field	Choice Count
1	Not knowledgeable at all	27.59% 8
2	Slightly knowledgeable	37.93% 11
3	Moderately knowledgeable	24.14% 7
4	Very knowledgeable	6.90% 2
5	Extremely knowledgeable	3.45% 1
		29

Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If you or someone you know needed help for drug use/misuse, how knowledgeable are you regarding where resources are in your local area and how to access them?	1.00	5.00	2.21	1.03	1.06	29

Q7 - How likely are you to use a mobile app to access information on treatment

resources in your local area?



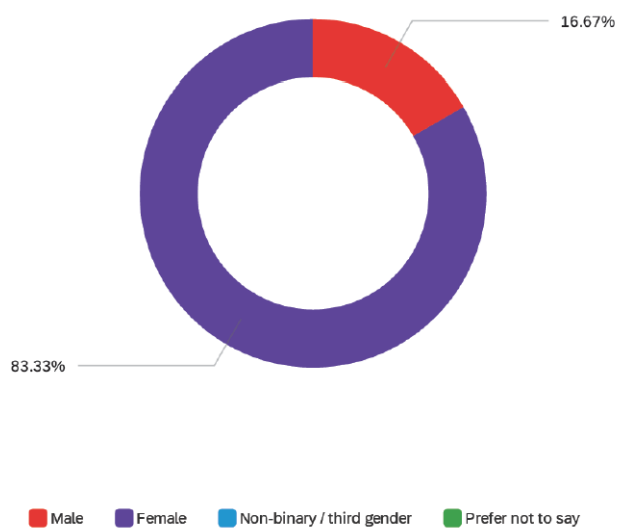
#	Field	Choice Count
1	Extremely unlikely	6.90% 2
2	Somewhat unlikely	13.79% 4
3	Neither likely nor unlikely	10.34% 3
4	Somewhat likely	37.93% 11
5	Extremely likely	31.03% 9
		29

Showing rows 1 - 6 of 6

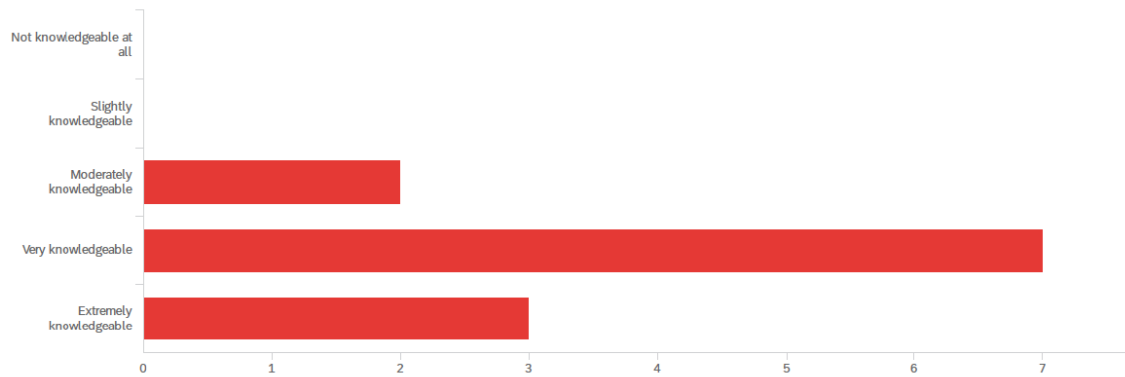
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How likely are you to use a mobile app to access information on treatment resources in your local area?	1.00	5.00	3.72	1.23	1.51	29

## Appendix X. Post-Pilot Survey Findings

Q4 - What is your gender?



Q5 - After beta testing the Granite Connects app, how knowledgeable do you feel about drugs?

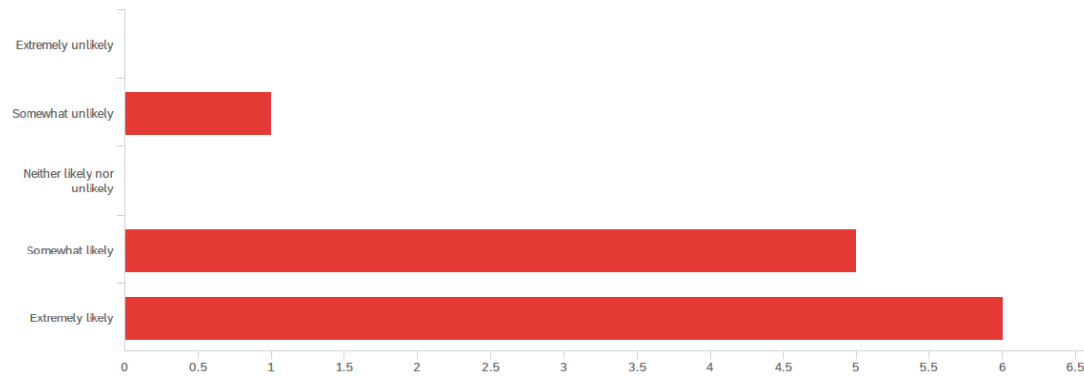


#	Field	Choice Count
1	Not knowledgeable at all	0.00% 0
2	Slightly knowledgeable	0.00% 0
3	Moderately knowledgeable	16.67% 2
4	Very knowledgeable	58.33% 7
5	Extremely knowledgeable	25.00% 3
		12

Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	After beta testing the Granite Connects app, how knowledgeable do you feel about drugs?	3.00	5.00	4.08	0.64	0.41	12

Q6 - After beta testing the Granite Connects app, how likely are you to use this app in order to access information on drugs?

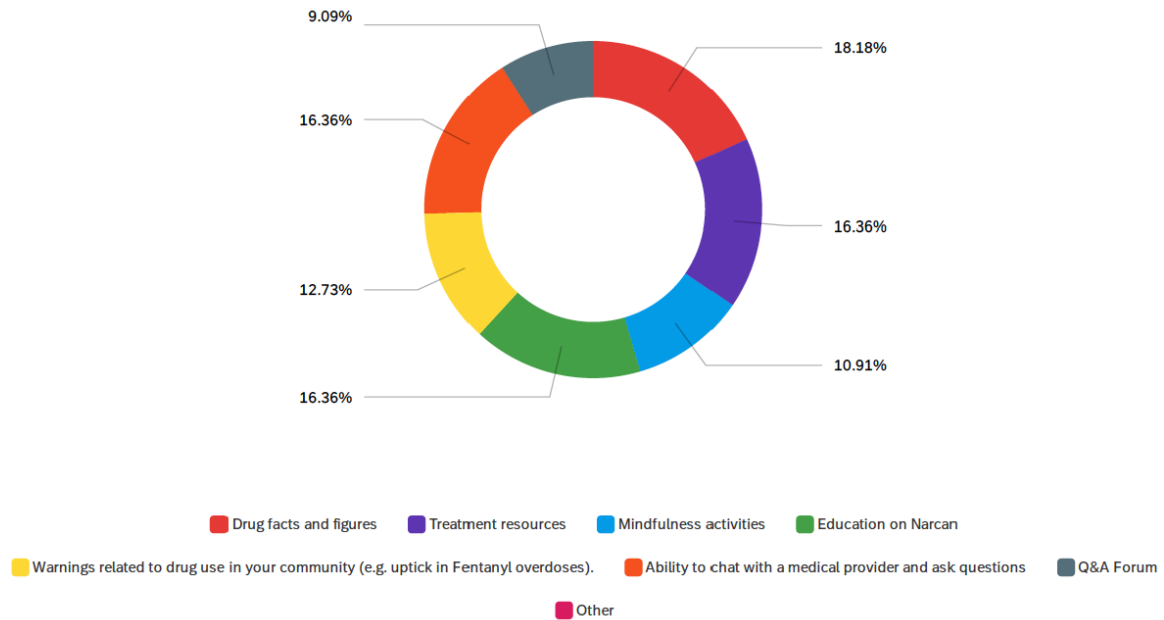


#	Field	Choice Count
1	Extremely unlikely	0.00% 0
2	Somewhat unlikely	8.33% 1
3	Neither likely nor unlikely	0.00% 0
4	Somewhat likely	41.67% 5
5	Extremely likely	50.00% 6
		12

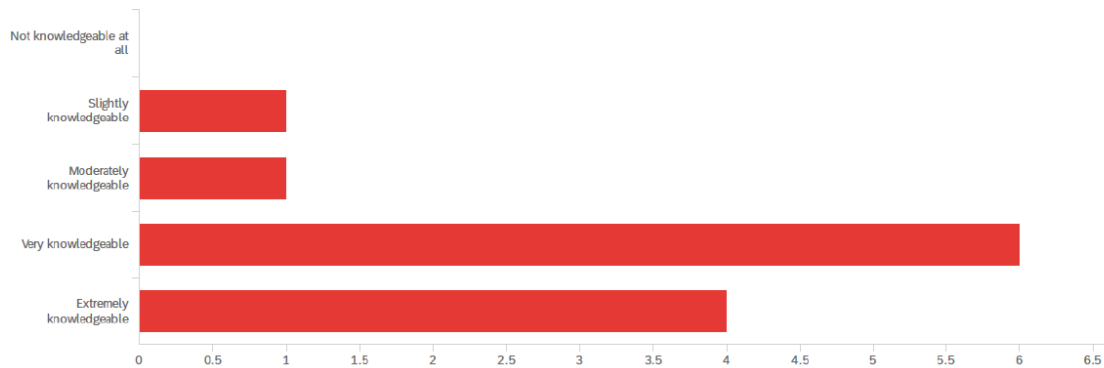
Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	After beta testing the Granite Connects app, how likely are you to use this app in order to access information on drugs?	2.00	5.00	4.33	0.85	0.72	12

Q7 - After beta testing the Granite Connects app, which feature(s) did you find informative and/or useful?



Q8 - After beta testing the Granite Connects app, how knowledgeable are you regarding drug treatment resources are in your local area and how to access them?

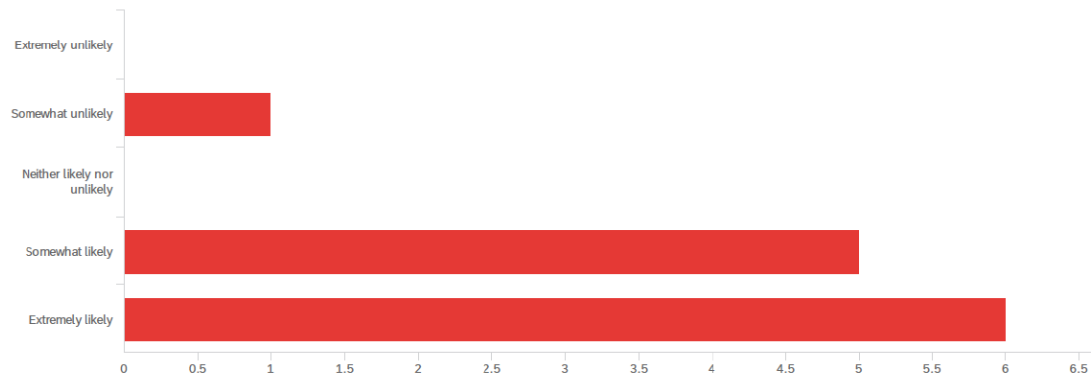


#	Field	Choice Count
1	Not knowledgeable at all	0.00% 0
2	Slightly knowledgeable	8.33% 1
3	Moderately knowledgeable	8.33% 1
4	Very knowledgeable	50.00% 6
5	Extremely knowledgeable	33.33% 4
		12

Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	After beta testing the Granite Connects app, how knowledgeable are you regarding drug treatment resources are in your local area and how to access them?	2.00	5.00	4.08	0.86	0.74	12

Q9 - After beta testing the Granite Connects app, how likely are you to use it in order to access information on treatment resources in your local area?



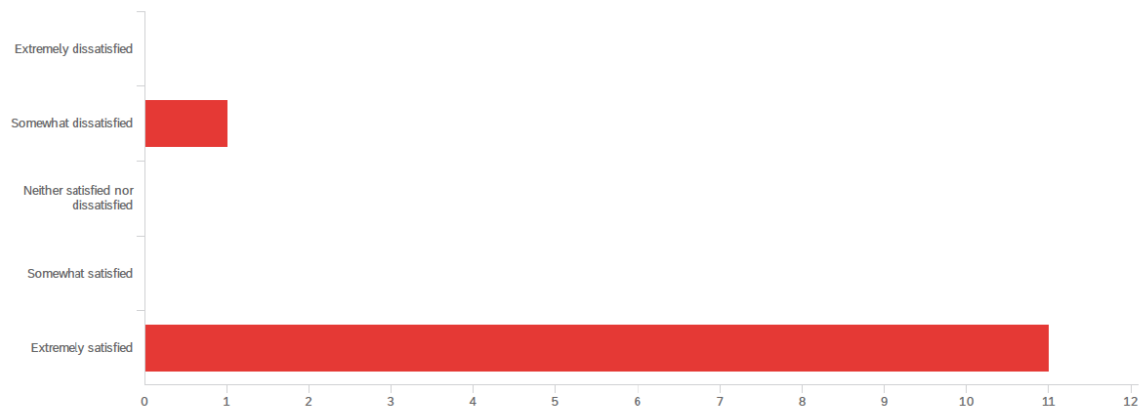
#	Field	Choice Count
1	Extremely unlikely	0.00% 0
2	Somewhat unlikely	8.33% 1
3	Neither likely nor unlikely	0.00% 0
4	Somewhat likely	41.67% 5
5	Extremely likely	50.00% 6
		12

Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	After beta testing the Granite Connects app, how likely are you to use it in order to access information on treatment resources in your local area?	2.00	5.00	4.33	0.85	0.72	12



## Q10 - How satisfied are you with the Granite Connects app?

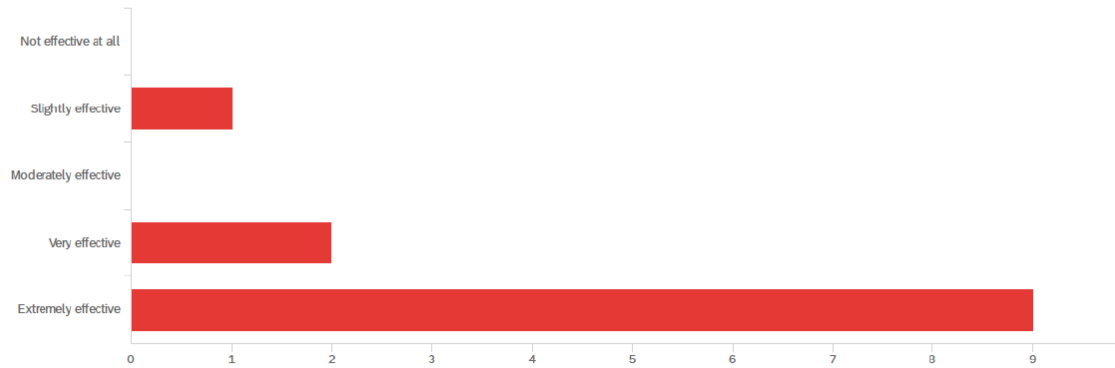


#	Field	Choice Count
1	Extremely dissatisfied	0.00% 0
2	Somewhat dissatisfied	8.33% 1
3	Neither satisfied nor dissatisfied	0.00% 0
4	Somewhat satisfied	0.00% 0
5	Extremely satisfied	91.67% 11
		12

Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How satisfied are you with the Granite Connects app?	2.00	5.00	4.75	0.83	0.69	12

Q11 - How effective is the Granite Connects app in providing information on drugs and local resources?



#	Field	Choice Count
1	Not effective at all	0.00% 0
2	Slightly effective	8.33% 1
3	Moderately effective	0.00% 0
4	Very effective	16.67% 2
5	Extremely effective	75.00% 9
		12

Showing rows 1 - 6 of 6

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	How effective is the Granite Connects app in providing information on drugs and local resources?	2.00	5.00	4.58	0.86	0.74	12